

COAST ARTILLERY JOURNAL



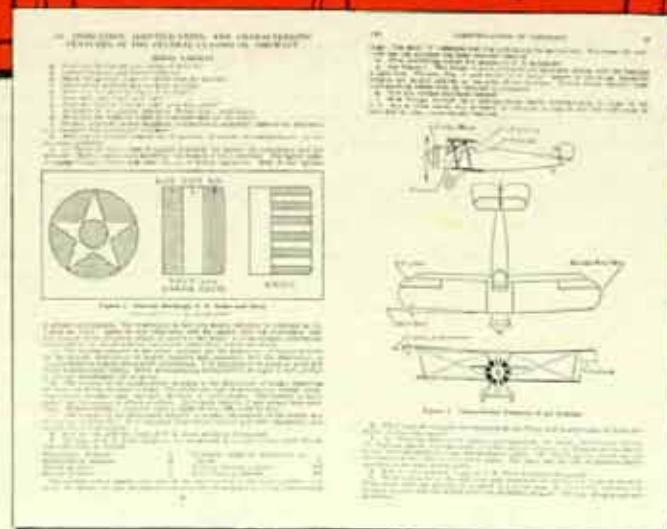
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COAST ARTILLERY JOURNAL

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A flight of Hampden bombers flying over London

GERMAN AA ARTILLERY TODAY

By Major Caesar R. Roberts, Coast Artillery Corps

A well known military axiom tells us that man has always developed a means to counter every new offensive weapon. It is not surprising, then, to find that the earliest recorded endeavor to use aircraft for military purposes almost simultaneously brought forth the very first antiair weapon.

During the siege of Paris in 1870, the beleaguered French used free balloons to carry passengers and mail from the city and over the lines of the surrounding German forces. This had gone on but a short time before the famous Krupp works at Essen built and sent to the German Army five "balloon cannon." On the 12th day of November, 1870, one of the new Krupp guns actually shot down a French balloon that essayed a sortie from the capital, and so for the time being summarily ended further attempts at air warfare. One of these weapons is still on exhibition in an arsenal museum in Berlin.

For a long time both the idea of aerial warfare and moves to counter it were laughed off. But at the turn of the century the appearance of a French dirigible and the later success of Count Zeppelin with his airships brought German studies to determine whether a foot or field artillery weapon was best suited to fight motor balloons. The results of the 1910 Kaiser Maneuvers and some special firings over the East Sea brought home the realization that a special weapon was needed to fill the rôle. The develop-

ment of such a weapon was undertaken, but for quite a while firing instruction was confined to theory because no practicable targets were available. However, the outbreak of the war in 1914 found in Germany some eighteen cannon designed for defense

against balloons. At first attached to army corps, they were soon withdrawn for the defense of the bridges and airship hangars at Düsseldorf and Friedrichshafen, as well as the gasworks in Köln. And it was only a short time before there arose a great demand for more and more of these weapons. Nonetheless, the needs of the foot and field artillery took precedence, so as a temporary measure captured French and Russian guns, for which ammunition was available, were improvised for this new defense. By the spring of 1915 there were some 200 balloon defense cannon—called *Bak*—and it was at this time that the first attempts were made to collate and study the practical knowledge and experience gained in ground defense against aircraft, from all over the Western front. As a result, a special service for this new field of combat was organized on July 10, 1915. But it was not until almost a year later that this new service received the name by which it is known today, that is, *Flak* Artillery. The word comes from the first letters of *Flug-Abwehr-Kanonnen*; *Flug* for *Flugzeug*, meaning airplane; *abwehr*, for defense, and of course *Kanonnen* for cannon.

It was soon realized that a new weapon with longer range, larger caliber, shorter time of flight and improved laying apparatus was absolutely essential. Because of the tremendous overload that the war industries were carry-

ing, it was a year and a half before a weapon considered superior to those of the enemy was delivered at the front. A director, called *Kommandogerät*, was developed and sixty of these reached the front before the Armistice. Night attacks became a source

*Be at the right place at the
right time; open fire in the
shortest possible time*



8.8-cm. Flak towed by medium cross-country vehicle.

of worry, and the searchlights, formerly operated by the pioneers were taken over by the Flak service in July, 1917. Special schools were soon organized, one being set up behind the Flanders front. It is interesting to note that one of the very first of the instructional staff was a First Lieutenant Rudel, today General of the Flak Artillerie and chief of all air defense.

A range-finder's school, finally capable of instructing 1,200 men in range-finding, lead computing and airplane identification was established at La Fère as early as July, 1915; the school later moved to Ghent. A school for motor transport—within the service—was set up at Valenciennes in April, 1917; a searchlight school, at Hanover, and finally a school in Brussels for the airplane reporting service, as well as a small military-technical academy.

It was on the 8th of October, 1916 that this service definitely became part of the German Air Corps, and General von Hoepner was placed at its head.

The end of the war saw some 2,210 heavy Flak weapons and about 356 light Flaks in service at the front or in rear area defenses. Only about an eighth of these were considered worthwhile weapons, and only a tenth were equipped with directors. The Germans point with no little pride to the accomplishments of the new arm. Casualties counted were airplanes or airships definitely shot down, and of those forced down, only the ones landing behind German lines. Hauptman Matthey gives the following comparison of German and British losses from antiaircraft fires:

Year	SHOT DOWN BY		
	German Flak	British A.A.	
1915	51 planes 1 airship	20 planes	
1916	322 planes 1 airship	50 planes	
1917	467 planes	95 planes	
(10 mos.) 1918	748 planes	176 planes	
<hr/>			
Total	1,588 planes 2 airships	341 planes	

The Allies apparently realized the effectiveness of the German AA artillery, for the Treaty of Versailles forbade

this new weapon in the Reich's military forces, with the bare exception of a few pieces in the fixed defenses of Fort Koenigsburg. Owing to a strange oversight the German Navy was able to carry on development, and a great deal was accomplished, especially with the small caliber weapons and the range-finding apparatus.

But no treaty, however severe, was able to prevent the German mind from studying antiaircraft defense. Moreover, their military students took advantage of the success or failures of other nations in development. When complimented on the great progress that has been made in so brief a time, it is not surprising to have Flak artillery officers answer that during the past years the best brains and talent of the nation were working with them on their problems.

BASIC ORGANIZATION

The combined armed forces of the nation are known as *Die Wehrmacht*, composed of the Army (*Heer*), the Navy (*Kriegsmarine*) and the Air Force (*Die Luftwaffe*). The latter came into official existence on March 1, 1935. It is composed of: Flying units, called *Die Fliegertruppe*; Air intelligence units, or *Luftnachrichtentruppe*; and the Flak artillery.

Fairly recent figures on the personnel strengths of the three subdivisions of the *Luftwaffe* gave the flying corps about forty-five per cent, the air intelligence troops about fifteen per cent, and the Flak artillery the remaining forty per cent of the total strength.

Before the enlargement of the Reich through the recent annexations, there were seven air districts throughout the land, each under the command of a general officer.

The Flying Units. Usually listed first are the observation or reconnaissance elements, some of which are attached to army corps when the latter take the field, and perform the customary duties. Those that remain with the Air Force proper perform similar though longer distance missions. It is pointed out that their mission is to obtain and bring or send back information, that they are to avoid combat, and may be expected to fly singly and at high altitudes.

Bombing planes are divided into two distinct classes. The first is the powerful, multimotored, long range type, while the second is the dive bomber, reserved for objectives demanding a high degree of bombing accuracy; these latter are manned by specially selected and trained pilots. Three planes form a *Kette*. The basic unit is, however, the *Staffel*, consisting of nine planes. Three *Staffeln* constitute a *Gruppe*, and three *Gruppen* make up a *Geschwader* of some eighty-one planes in all. Hauptman Neuman says that by day the bombers move to the attack in *Geschwader* units.

The pursuit element is known as the *Jagdflieger*. Schilffarth and Sachs state that they will usually be found working in coöperation with the Flak artillery, are of high speed, but of comparatively short range. Attack airplanes as such are not mentioned. Seaplanes are divided into the various classes to which we are accustomed.

The *Air Intelligence Troops* are organized into companies:

- Telephone operating
- Teletype operating
- Telephone construction
- Radio
- Radio beacon, and
- Airplane reporting

The companies may be grouped into battalions and regiments as desired. In general, units are motorized. The task of these troops is to operate and maintain all communication means. Their duties are considered of great import and the outcome of battles will be greatly influenced by the manner in which they perform.

THE FLAK ARTILLERY

The missions of the artillery are essentially those stated in our own Coast Artillery *Field Manual*, but it is interesting to note that Schilffarth and Sachs point out that Flak artillery can carry out its task only when an efficient airplane reporting service gives timely warning of the approach of every enemy airplane.

The basic units are the *Abteilungen* or battalions. The heavy battalion, corresponding to our gun battalion, is composed of:

- A staff battery, including a meteorological section,
- 3 gun batteries, manning four 8.8-cm. guns each,
- A light battery, manning six 2.0-cm. Flaks,¹ and
- A searchlight battery, operating nine 150-cm. lights.

The unit is apparently a training rather than a tactical grouping. In the field, the six 2.0-cm. Flaks are divided up among the gun batteries, two to each battery.

A light Flak battalion the writer visited at Brandenburg was composed of the usual staff battery, three firing batteries manning twelve 2.0-cm. Flaks each and a searchlight battery manning twelve 60-cm. lights. It was stated that a 3.7-cm. battery was to be added to the organization as soon as the equipment became available.

Very little mention of machine guns is found in books dealing with Flak artillery although there are some AA machine-gun companies. These are nearly always found in the fixed defenses and are not normally equipped with motor vehicles. Several machine-gun sections are combined into a company and commanded by a captain.

¹In the fall of 1935, this light battery manned 3.7-cm. guns but Schilffarth and Sachs in 1938 show each heavy battery to have two 2.0-cm. Flaks. It was understood that these light weapons are grouped together as a battery for training purposes only.



"Prepare for action!" 8.8-cm. Flak.



3.7-cm. Flak

THE LIGHT FLAK

One of the most interesting and important developments in antiaircraft artillery is the intermediate caliber weapon. In the German artillery there are two distinct types in service, the 2.0-cm. and the 3.7-cm. guns.

The 2.0-cm. gun is the more recent of the small caliber weapons. It is carried on two wheels and towed by a truck. In traveling position with accessories it weighs some 1,500 pounds. An ammunition clip holds twenty rounds, each cartridge weighing about $10\frac{1}{2}$ oz. With the well known super-sensitive fuze, a round fired from a distance of 150 meters at two pieces of cardboard, 2-mm. thick, spaced twenty centimeters apart, penetrated the first piece with a clean hole, and exploded before reaching the second piece. Fired at a meteorological sounding balloon, the round exploded within the balloon. Fired at an airplane wing, it burst between the surfaces, completely shattering the structure.

The shell is self-destroying after a flight of 5.5 seconds or about 2,100 meters range. Without the self-destroying element, the range is given as 4,400 meters. The muzzle velocity of the weapon is 900 meters per second. The weapon's effectiveness well overlaps the minimum effective ranges of the heavy Flak.

The secret of the success that has been obtained with this weapon and the 3.7-cm. Flak—as demonstrated in Spain—is to be attributed to the fire control sight used with the individual piece. The sight, known as the *Flakvisier 35*, is of the reflecting-mirror type, with a data calculating mechanism. A model similar to this one in principle, was described in "Zeiss Machine-Gun Sight" by Major William R. Sackville, C.A.C., in the November-December, 1937 issue of the COAST ARTILLERY JOURNAL.



3.7-cm. Flak ready to fire from wheels.

The sight has a knob at its base which an operator points parallel to the direction of the target's flight. The gun commander estimates the ground speed of the target and calls it to the operator, who sets the valve on one of the disks. The stereoscopic range reader furnishes the slant range, which is also set in. The necessary leads are automatically furnished the gun pointer.

Though the rated firing speed is 280 rounds per minute, the rate actually obtained is about 110-120. Only two or three rounds are fired at a time, the piece being carefully laid for each burst.

The value of the sight depends, of course, on the skill of the operator, and on the ranges furnished. Each gun crew has a stereoscopic range reader, equipped with the *Em 1 mR* range finder (1-m. base), with which he is able to read ranges from a minimum of 250 meters up to 8,000 meters. During a drill that the writer witnessed, the range reader called off the slant ranges in even hundreds of yards every several seconds. Great stress is laid on the training of these operators.

In an emergency, the piece may be fired from the wheels, about thirty seconds after the order is given. Ordinarily it takes about two minutes to put it down in the normal firing position. It may be dismantled and put in firing position on roof-tops, bridge piers, and so on.

There are two models of the 3.7-cm. Flak. The principal difference seems to be in the mounting of the weapon. The heavier and older type, called the 3.7-cm. Flak 18 is carried on two bogie trucks, while the newer 3.7-cm. Flak 36 is mounted on one axle. Though rated as firing 150 shots a minute, the expected rate is from sixty to seventy aimed shots per minute. The complete round weighs 1.5 kgs. and there are six rounds to a clip.

The maximum range of the piece is given as 8,000 meters. The projectile ordinarily has the self-destroying device which functions in ten to fourteen seconds at about 3,600 to 4,200 meters. A fire control sight similar in principle to the *Flakvisier 35* is used on the 3.7-cm. gun, and each crew has its stereoscopic range reader with the *Em 1 mR* apparatus.

The 2.0-cm. batteries are organized with four firing sections of three guns each, while the 3.7-cm. units have but three firing sections of three guns each.²

²In the fall of 1935 the 2.0-cm. units were organized into three firing sections with four guns each. The present setup is taken from Schilffarth and Sachs, edition of March, 1938.



3.7-cm. (Model 18) Flak in firing position. Range reader at left.

The 2.0-cm. battery has five small radio cars, equipped with two-way voice transmission sets, working on high frequencies, with a range of six or seven kilometers. There is also a larger radio truck equipped with a more powerful set. The 3.7-cm. battery has a smaller amount of radio equipment.

With each of the light batteries in the field, there is a platoon of four of the small searchlight units. These small lights have mirrors of a diameter of 60-cm.—just under twenty-four inches—and are powered by an eight kilowatt plant, carried normally in the towing truck. Sound locators are not used with the small lights.

THE HEAVY FLAK

The heavy cannon has a caliber of 8.8-cm., a barrel length of 56 calibers, rated muzzle velocity of 820 meters per second, and can be traversed through 360° and elevated at 85°. The azimuth and elevation handwheels have a slow and a fast speed of operation. The rate of fire is from fifteen to twenty rounds per minute. It is understood that a heavier cannon is contemplated but no details of this weapon are at hand.

Two of the four cross-arms that support the piece in the firing position together form a stout truss with the base of the mount at its center. In the traveling position, the truss ends are carried by the front and rear truck bogies. The other two cross-arms, at right angles to the truss, fold up vertically in the traveling position. Two cables, heavy hammers, picks and shovels are carried on the front bogies, while the telephones and fire control cables are on drums mounted on the rear bogies.

Because of the closeness of the gun trunnions to the ground and the weight of the round, a loading tray and automatic rammer are provided. The latter is powered by a spring, the tension of which is varied with the barrel elevation, and which must, for the first round, be armed by a crank. After the round has been thrown into the chamber, the loading cannoneer swings the tray out of the path of the recoiling piece. This movement of the tray serves to fire the piece when set at "automatic" though it can also be fired by a right or a left hand firing lever.

The weight of the complete round is 14½ kilograms (about thirty-two pounds) while the shell itself is about nine kilograms or a shade under twenty pounds. Clockwork fuzes are used, and two fuze-cutters are located on the left side of the piece. The shell is said to break up into some 300 effective fragments on bursting and the detonating effect alone is claimed to be sufficient to put a plane out of action if within a radius of thirty meters of the point of burst.

"PREPARE FOR ACTION"

The command "*Stellung*" or, "Prepare for action" is one that the recruit hears early in his career, for very shortly after his call to the colors, two hours of the afternoon periods are devoted to drill on the piece. At first carefully taught each and every motion for going into position and back to march order again, soon the element

of competition is stressed and every crew strives to be the first to report their Flak "ready."

After the mount is unhooked from its towing vehicle, and while some of the cannoneers unload ammunition and equipment before the tow truck leaves for the truck park, others lower the two sides cross-arms to the horizontal and lock them stoutly in place. The whole piece is then lowered to the ground directly from the bogies by cranking suitable gear. Leveling is accomplished both by base plates screwed to the ends to the cross-arms and at the undercarriage itself.

A panoramic sight is placed in position on top of the counter-recoil cylinder and used to orient the piece. Meanwhile fire control cables and telephone lines are run out from each gun to a junction box. The gun commander's breast telephone transmitter and head set are gotten out for him, connected up, and his "gun commander's firing table"—used in certain phases of emergency fire control—is taken from its place on one of the cross-arms and handed to him. The open, and the telescopic sight for emergency fire control use, are also put into their receptacles on the gun. The whole operation is performed with incredible speed, accuracy and quiet and if there is the least good reason to move a gun or the battery, there is no hesitancy in carrying out the move. Time permitting, camouflage measures are initiated, the barrel pointed into the sun to throw the least shadow, or perhaps a tree or branches are tied to it, pointed vertically. Camouflage is strongly stressed throughout the AA artillery.

THE "KOMMANDOGERÄT"

There are two battery command posts. The principal one is located at the site of the *Kommandogerät*, or director, which is always placed 100 meters or more to the flank of the firing position. The director is a very sturdy apparatus, comparatively simple in construction, with a minimum of mechanical and practically no electrical parts. Ballistic values are read from drums. It is a linear calculating apparatus, and the predicted point (*treffpunkt*) is determined in both the horizontal and vertical planes. Corrections may be set in for parallax, barrel erosion, loading time, wind and drift, and spot corrections for elevation, azimuth and fuze. The modern directors predict for diving or climbing flights.

The stereoscopic instrument, called the *EM 4 m R (H)* reads ranges from 670 meters upward and with the adjusting apparatus weighs 420 pounds. It operates as an integral part of the director, with three men as crew. The director, owing to its mechanical simplicity, requires an operating crew of ten men. In spite of this seemingly cumbersome group, an airplane flying at some 1,200 to 1,500 meters was apparently tracked with ease. Short ranges rather than low altitudes determine the minimum effective fire zone, targets under 800 meters range having too high an angular velocity to permit firing. It is claimed that a well directed fire can be brought to bear on targets even under 100 meters altitude if the range is not too short and safety of friendly troops not jeopardized.

officer, and his chief noncommissioned officer, with Nos. 1 and 2 of the height finder crew and B-4 of the director crew, proceed to this apparatus and locate the target in it. The E-1 (stereoscopic reader) and B-4 report as in normal director operation.

In addition to indirect firing with the director and auxiliary director, direct firings are carried on with the two "Am's," and by free firing.

The first method is described in Captain Nauman's handbook but is not mentioned by Schilffarth and Sachs. The "Am" appears to be an instrument for measuring the horizontal and vertical angular displacements of a target during a time of one third of the estimated time of flight. Based on the range given by the stereoscopic reader, a stop-watch operator signals his "Am" operator when to start and stop his measurements. Two crews operate alternately and the vertical and azimuth leads as well as the ranges are sent to the guns.

Using his "gun commander's firing table" the gun chief calls out the superelevation and fuze-cutting values to his crew. The battery fires on a signal, and though obviously the rate of fire is slowed down considerably, it is definitely not stopped all together.

Free firing comes into use only when the apparatus for the other methods is inoperative or not available. The fire director has only ranges to aid him. Without ranges no firing is attempted. The method is referred to as simple but inaccurate. The fire director must estimate the target speed and a true picture of its flight director. Based on the range and his own estimates, made through knowledge and experience gained in firings, he gives the fire commands. He calls out the range, and the estimated horizontal and vertical displacements of the target. Using the range and target elevation, the gun commanders determine the superelevation and fuze settings. For the "command and loading time" about eight seconds is allowed as a rule though some fire directors are able to cut this to seven or even six seconds when working with a highly trained battery.

THE RANGE FINDER SERVICE

The German training regulations state that: "In firing against airplane targets, correct range determination is the basic requirement in calculating useful firing data. Success in such firing, especially in the case of the heavy Flak, rests to the very highest degree upon the proper performance of the range readers." Throughout the Flak artillery, the training of this personnel is strongly stressed, and the regulations go on to say that such training can never be too thoroughly or too painstakingly carried out.

In addition to stereoscopic eyesight, the requirements of a good range reader are stated to be: high degree of quick perception, strength of resolution, ability to concentrate, high sense of responsibility, and strong resistance to physical and mental strains.

The course of instruction, both theoretical and practical, is very complete. Two students normally work together, one acting as recorder while the other reads. After initial

instruction on fixed targets, where a series of six readings is twice made without removing the eyes from the instrument, readings are made on signal of the instructor, against time. Every reading is recorded in a book which the student always keeps with him. The recording is made at the time, if known, or entered as soon as determined by the data section. The essence of the training is what the student is able to learn from a study of his record book, for therein he has recorded all conditions of the moment, the adjustments on his instrument, the nature of his errors and their relative magnitude. A good reader will give the ranges every several seconds, generally accurate to the third significant figure.

The proper and timely adjustment of his instrument is of great importance, but the most important element of his training is an accurate control of all practices. Of the two general methods used, the best is of course, work with a well trained record section. Cameras similar to those used in our service are operated at the ends of a baseline. When this method is not practicable, a thoroughly experienced and trustworthy stereoscopic operator makes readings simultaneously with those of the students. One method or the other, however, is always used.

In working with the 4-meter base instrument (*Em 4m R(H)*) stereoscopic contact with the target is maintained continuously, except that on the signal the range knob is momentarily held still so that the recorder can properly note the reading (range or height) at the given instant.

As every light Flak—both 2.0-cm. and 3.7-cm.—have a range reader, and each gun commander is supposed to be a qualified operator, the stereoscopic range and height finder work is given much attention throughout the Flak artillery.

THE HEAVY SEARCHLIGHT (150-CM.)

To those familiar with our own searchlights there are several interesting points about the German light units and their operation. The heavy searchlight battery mans nine lights complete with sound locators,³ divided into three platoons of three lights each. Though for peacetime training each heavy gun battalion has a searchlight battery with it, the unit for all-around illumination is the searchlight battalion of three batteries, or twenty-seven lights in all.

As the lamp itself, as well as the power plant and the sound locator are each mounted on wheels and towed by trucks, the unit appears at first a little cumbersome. In the leading truck there is found, besides the driver, the light commander and cannoneers Nos. 1 to 4. In the vehicle towing the power plant there is the driver and cannoneers Nos. 5 and 6; in the last truck, towing the sound locator, we find a driver and cannoneers Nos. 7 to 10, making a total crew of fourteen men.

In the operating positions, the lamp and the sound locator have their bogie trucks removed and rest on the ground on four jacks with base plates. The power plant,

³Schilffarth and Sachs (March, 1938) show only six of the nine light units to have sound locators; Schluchtmann's pamphlet on searchlights (August, 1938) shows all nine to have them.



2.0-cm. Flak.

usually 200 meters away from the light unit, consists of an electric generator of twenty-four kilowatts capacity, driven by a gasoline motor.

The sound locator has the usual four horns, formed with the exponential curve, but each of the horns may be likened to a funnel, bent into a U shape, with the small end of all four coming together in the middle of the group. Seen from the front, the mouths of the horns, or funnels, form a torus. The assembly of four horns is carried on a yoke which resembles the one on our own lamp units. Seats for the listeners, one on each side, are attached to the base of the yoke, and above each seat is a ring to which curtains, reminding one of those used in a shower bath, are hung to act as blindfolds for the listeners during daylight drills. At each listener position there is a small light switch, which when closed, lights two small signal lamps, one in front of the sound lag corrector operator, the other in front of the opposite listener. When either listener is centered on target, he signals the fact by closing the switch.

The sound lag corrector is built into the base of the yoke and is operated by Cannoneer No. 7. The light commander or the operator himself estimates the target speed and sets it into the mechanism. A correction for variations in the velocity of sound is also set in. The average velocity is determined from information furnished by a meteorological section. The data transmission system is the same as that used between the director and the guns, an azimuth and elevation receiver being mounted on the lamp itself.

There is no distant electric control. Cannoneer No. 2 setting the lamp in elevation from his position at the lamp, and No. 3 moving it in azimuth by means of the hand

control bar. Cannoneer No. 3 can also make small elevation changes. At the command "in action", No. 2 opens the lamp shutter. About three seconds is allowed for the eye to become accustomed to the light before any searching is started by No. 3. The light commander assists him from a post fifty to one hundred meters to the side and twenty to thirty meters in rear. No. 4 also assists in the search.

A unique feature of the light is the provision for searching with a spread beam, using the focused or sharp beam for carrying. The spread beam is a 4° cone which at 10,000 meters slant range has a width of about 700 meters; The sharp focused beam is a $1^\circ 9'$ cone and has a cross-section of 250 meters at this range.

There are two methods of searching. When working with sound locator data, after three seconds the beam is elevated a beam-width and then moved through 360° in a counter-clockwise direction, tangent to the initial cone position. About five seconds are allowed for the movement. When working without sound locators, the beam is moved in a vertical arc of from 200 to 300 mils and at the top and bottom of each movement it is moved in azimuth about a beam width. For a coming target, the movement is deeper and narrower than for a passing target.

LISTENER TRAINING

The training of listeners is progressive, and continuity of practice is heavily stressed, some type of listener work being carried on every day of the week. For basic listener training, as well as for use during inclement weather, an interesting design of binaural trainer is used. There are two record players, one for the principal sound, while the second player superimposes a disturbing sound, the type



8.8-cm. Flak. Projectile on loading tray.

and intensity of which are varied to suit progress. The trainer accommodates six listeners at a time.

A good deal of work is carried on by day, the practice being controlled by suitable apparatus, to show the amount of variation between the target and the simulated light beam.

FIRING TRAINING AND TARGET PRACTICE

Training on the light Flak begins much as does our own work in rifle marksmanship. The usual sighting drills are held and checked as in our barrack yards. Then follows training in the various operations required for a sight setting. The sight operator has to set a pointer on the base of the sight, parallel to the target's flight; so practice is carried on in this operation, and each setting carefully checked. Training in estimating target speeds must be given, and some training in range estimation is also carried on, for use in the event the range reader cannot furnish the necessary ranges. Firing practice starts with single shots at fixed targets, followed by short bursts, and then comes firing at moving targets. Scores are kept for each gunner.

When tracer firing is done the data is still kept set in the sight mechanism so that the latter can be instantly used on command.

Combat firing is the goal and is made as realistic as is possible. Situations requiring an instant decision of the gun commander as to which targets to take under fire are



8.8-cm. Flak mounted on flatcar.

arranged; also problems requiring a change of target, or even the opening of fire from the traveling position, are carried out.

Virtually all service practices of the heavy batteries have been conducted at Wüstrow on the North Sea, the location of the Flak Artillery School. This is due primarily to lack of adequate firing ranges in the densely populated Reich; but there are many compensations for the difficulties involved in sending the batteries to Wüstrow.

As the short firing season in peacetime is not enough for either training or maintaining efficiency, at the home stations resort is had to a simulated firing practice called *Optischen Erprobungen* or optical testings. One or more target planes may be used, and having no sleeves to tow, they may simulate actual war conditions very closely. The paths of the target planes are very accurately determined by camera theodolites at the ends of a baseline.

Eleven recorders are used at the director and three at each gun. Normally the battery fires every three seconds on signal and the data readings are taken on the signal for the simulated firings. Firing data is calculated to include drift, wind effects, barrel erosion, etc., but in the analysis these elements are cancelled where necessary by entering them with opposite signs. The instant of simulated burst is determined from firing tables. By means of a carefully worked out procedure for analysis, personnel errors (including of course the work of the height finder operator) may be determined. With a thoroughly trained stereoscopic operator, the base end instruments are sometimes dispensed with, his readings being taken as correct.

A system of mirror firings, also referred to by Schillfarth and Sachs, uses the optical law that angle of incidence equals the angle of reflection. Bursts are actually distant from the target but appear to observers, by means of an arrangement of mirrors, as if actually fired at it.

Service practices of the heavy Flak are made as realistic as possible. They begin, in part at least, with the piece in the traveling position. Situations requiring quick decisions of the battery commander or executive are developed, as well as ones requiring changing of targets. Firings are carefully controlled, cameras at base ends being used and all data carefully noted, at each salvo, by a staff of recorders. It is claimed that an analysis of a practice will show

up personnel errors, whether of the director crew, the range reader, or even one of the data setters at a gun.

DEPLOYMENT

"To be at the right place at the right time, able to open effective fire in the shortest possible time" is the basic principle for deployment and the fulfillment of these requirements takes precedence over all other tactical and technical considerations for the march or preparation for action.

The regulations go on to say that the great mobility of the air attacker, plus his ability to attack from any direction, might at first thought lead to a wide deployment of the Flaks with the idea of engaging the enemy from the greatest number of places possible. Actually such procedure leads, they say, to a "splitting of power" and is to be rejected.

Frederick the Great, long before the day of the Flaks, said: "He who tries to protect everything, protects nothing." It is held far better to concentrate strength at important points or areas, so as to make more probable, through coordinated fire action, the destruction of enemy forces.

Much stress is laid on the mobility of the Flak artillery with the feeling that through mobility and quick changes of position, air attackers may be both deceived and surprised. While on a march or making short changes of position the fire power of the arm is temporarily suspended. Careful preparation for the march with speedy and accurate emplacements of the elements is therefore demanded.

Concealment is held to be of great importance, not so much with the thought of protection of personnel and equipment but rather to increase the possibility of deceiving and surprising the enemy.

Such sketches or diagrams of heavy Flak deployments as are available indicate a tendency towards the very close-in type of gun defense, with some batteries as near as 1,500-1,800 meters to the edge of the objective. The battalion of three batteries is the unit for deployment, and the battery is the fire unit. However, every effort is made to bring targets under the fire of at least two batteries.

For the defense of a small but important area, batteries are shown spaced from 4,000 to 5,000 meters apart. A sketch showing the deployment for the defense of an army corps assembly area gives a spacing of about 9,000 meters between batteries, and the effective fire zone of a single battery as 9,000 meters. As the expected altitude of the attackers is not shown, the significance of the 9,000 meters is not clear.

The normal ratio of heavy to light batteries is said to be 1:1. A sketch showing the very minimum ratio—actually said to be insufficient—of one light Flak battery to one heavy battalion is given in an example of a corps assembly area defense.

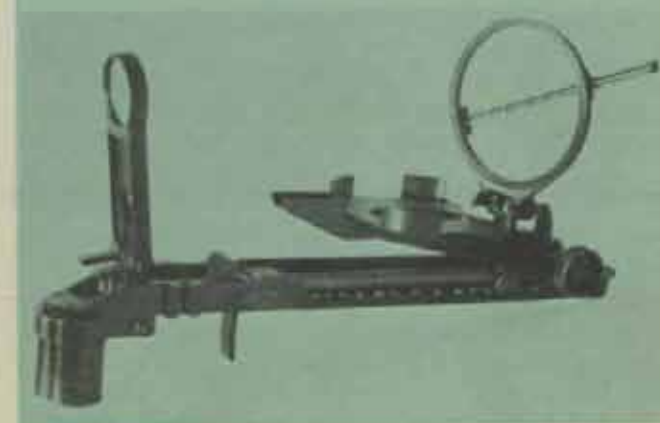
The light Flak battery is the tactical unit, though the platoon, section, or even individual piece, may at times be the fire unit. The light Flaks are placed from 100 to 500

meters apart, and from 1,000 to 1,700 meters out from the objective. In the 2.0-cm. Flak batteries, three of the four platoons form an all-around defense, while the fourth platoon is located right at the objective for defensive action against the much feared dive bombing attacks.

The heavy searchlight battery of nine lights normally covers a 120° sector, each platoon furnishing two lights to form a part of the outer ring with its third light in the inner ring. The outer ring is placed about 7,000 meters out from the gun batteries, with pickups expected a little in front of or above the outer ring. The platoon commander usually takes post at the inner light, or at a nearby Flak battery.

ANTI-AIRCRAFT DEFENSE WITH THE RIFLE

No discussion of the German antiaircraft artillery would be complete without some mention of the use made of the rifle in AA defense. The entire *Wehrmacht*—the nation's



Above: AA machine gun in action.
Below: Linear sight for light gun units.

armed forces—receive training in the use of the rifle and machine gun for defense against low flying enemy airplanes. Every text or pamphlet on Flak artillery makes a definite reference to this subject, some devoting quite a little space to it.

They say that they have come to "a realization that well directed rifle and machine-gun fires—provided of course in sufficient numbers—afford a not to be underestimated threat" to the attacker. For worthwhile effect, it is said that from fifteen to twenty riflemen should fire together, and many tests have shown that rifle fire by such a group will give as many or more hits than will be gotten from a machine gun.

The Germans claim that the failure during the war of 1914-18 of the rifleman and machine gunner to perform with credit against enemy airplanes was due to a lack of knowledge as to how to train for this type of defense.

Rifle fire is effective against low flying planes up to 600 meters, against dive bombers, flying directly towards the defenders, up to 1,000 meters. The crews of even the light Flaks, designed primarily for use against low flying planes, must always be able to take up effective fire with their rifles in event of stoppage of their primary weapons. The rifle must always be near at hand for instant use.

The cannoner fires from the standing, kneeling, prone or whatever position is most expedient. He first aims on the nose of the target, and at the same time takes up trigger slack. Then swinging the muzzle of his piece in the direction of the target's flight (except in the case of the dive bomber) until he has the required lead, he fires his piece.

Training starts with the usual sighting exercises, but most important is the estimation of the lead, measured in units of target length. He memorizes a few basic rules. With an approaching, leaving or passing target of a speed of sixty to eighty meters per second, the lead in plane lengths is equal to the range measured in hundreds of yards. For targets of over eighty meters per second the lead equals twice the range value measured in hundreds of meters; that is, for a target moving at a speed of ninety meters a second, at a range of 500 yards, the lead would be ten target lengths.

A board with airplane silhouettes painted on it, in various attitudes of flight, is used in the basic lead training. With the rifle on a sand bag rest the student points his piece a given number of lengths ahead of the figure. Having positioned his rifle, his estimate is checked by the

use of the sighting disk. After three trials the usual triangle is drawn.

Small bore firing is conducted on indoor ranges during the winter season, and practice at moving silhouettes is conducted. The figure of the airplane, moving in front of the cloth, has a target fastened to it at the prescribed distance ahead of it in plane lengths, but moving unseen by the firer, behind the cloth. The result of the shot shows on the target. In the later seasons, firing at actual sleeve targets is conducted.

RELATION OF MILITARY AND CIVILIAN AIR DEFENSE ORGANIZATIONS

The *Reichs-Luft-Schutzbund*, or National Air Defense Society, is an organization of more than four million citizens. Its primary mission is the protection of the lives and property of the civilian population in the event of enemy air attacks on their cities, towns and factory areas. It is also charged with the organization, training and operation of a nation-wide airplane warning service.

Civilians not available for regular military duty, the farmer and his wife, the school teacher and some of her pupils, and the operators of the State telephone service, all fill their places in watching for the enemy airplanes and reporting them to the evaluating stations. They are expected to perform invaluable service for the Flak artillery.

While the Society is composed practically entirely of civilians—including the local police organizations—the real head is in the office of the commander of the Flak artillery in Berlin.

From time to time all the largest cities and many of the smaller ones hold air defense practices, including black-outs. The exercises are always arranged to include the flying troops and Flak units of the local air force district.

It will not be amiss to conclude with the thoughts of Major von Pickert, of the National Air Ministry, who says that although modern antiaircraft artillery will offer a high order of resistance to the air attacker, it must ever be borne in mind that in the air as well as on the ground, a resolute and firmly carried out attack cannot be completely stopped. To render such attacks so costly that the enemy is either broken or so weakened that additional effort is difficult, is the task of well equipped, capably trained and operated Flak artillery.

The morale of the enemy, as well as his matériel, will be subjected to great wear and tear. How long the enemy can carry on, in spite of these factors, depends in the long run on how well the Flak artillery performs its task.



THE

NEW DIVISION



By Lieutenant Colonel Harry C. Ingles
Signal Corps

The new division organization, which the Secretary of War has recently approved and under which the Regular Army will be reorganized in the near future, is the result of several years of study and experimentation by the War Department. Many officers are now familiar with the approved organization but only a few know the many steps through which it was evolved.

There has been for years a body of well-informed opinion in the Army that the Army of the United States should be organized into small, highly mobile, hard-hitting units. In the hearings before the Congressional committees ever since 1930 we find recommendations by high War Department officials that our army be thus reorganized. However, our basic large unit—the infantry division—remained, until recently, the exact opposite type—large, slow, not well adapted for maneuver, and not particularly hard-hitting. No effective remedial action was possible prior to 1935, as the Regular Army was too small and no funds were available to equip small divisions with the modern armament and transportation necessary to make them as effective as the large ones which existed.

In 1935 the situation began to change. The authorized strength of the Regular Army had been increased to 165,000. A PWA grant had made it possible to increase materially the number of modern motor vehicles in the Regular Army and the National Guard. A program had been approved to procure semiautomatic rifles, 81-mm. mortars, 37-mm. antitank guns, and highly portable and more efficient communications equipment, and to modernize the 75-mm. Funds to carry out this program were being made available.

By that time, also, European powers were universally employing the triangular type of division—built around three regiments of infantry—which were much smaller and considerably more maneuverable than our division. Another thing which pointed to the reorganization of our

own division was the Japanese experience in Manchukuo. By 1930 the United States and Japan were the only major powers still adhering to the large square division built around four regiments of infantry—two brigades of two regiments each. The Japanese division had a strength of about 24,000 and ours, about 22,000. The Japanese found this division much too large and unwieldy to handle in the open-warfare situations encountered in Manchukuo and promptly reduced its strength to approximately 18,000, but retained the square organization. But even at this reduced strength they still found the square organization hard to handle, and have now gone to a triangular organization of about 12,000 men built around three regiments of infantry.

In 1935 a committee was appointed in the War Department General Staff to study the modernization of the organization of the Army and submit recommendations. The reorganization of the infantry division was to be the first step. At the same time the War Department called upon corps area and department commanders, chiefs of arms and services, the service schools, and many individuals for recommendations for a division organization.

The committee was directed to analyze and study these recommendations, study the organization of all foreign divisions, study and evaluate the modern improvements in weapons and transportation and formulate a reorganization of our division. The directive did not prescribe the type of organization that should be evolved, but it did direct that whatever organization was recommended its mobility off the battlefield must not be restricted to the gait of the foot soldier or the horseman.

The committee made an exhaustive study of foreign divisions and of all the recommendations submitted from the various sources throughout our army. It also conducted extensive hearings during which all chiefs of arms and services and many other officers appeared and gave their

Initial Organization Proposed for Test

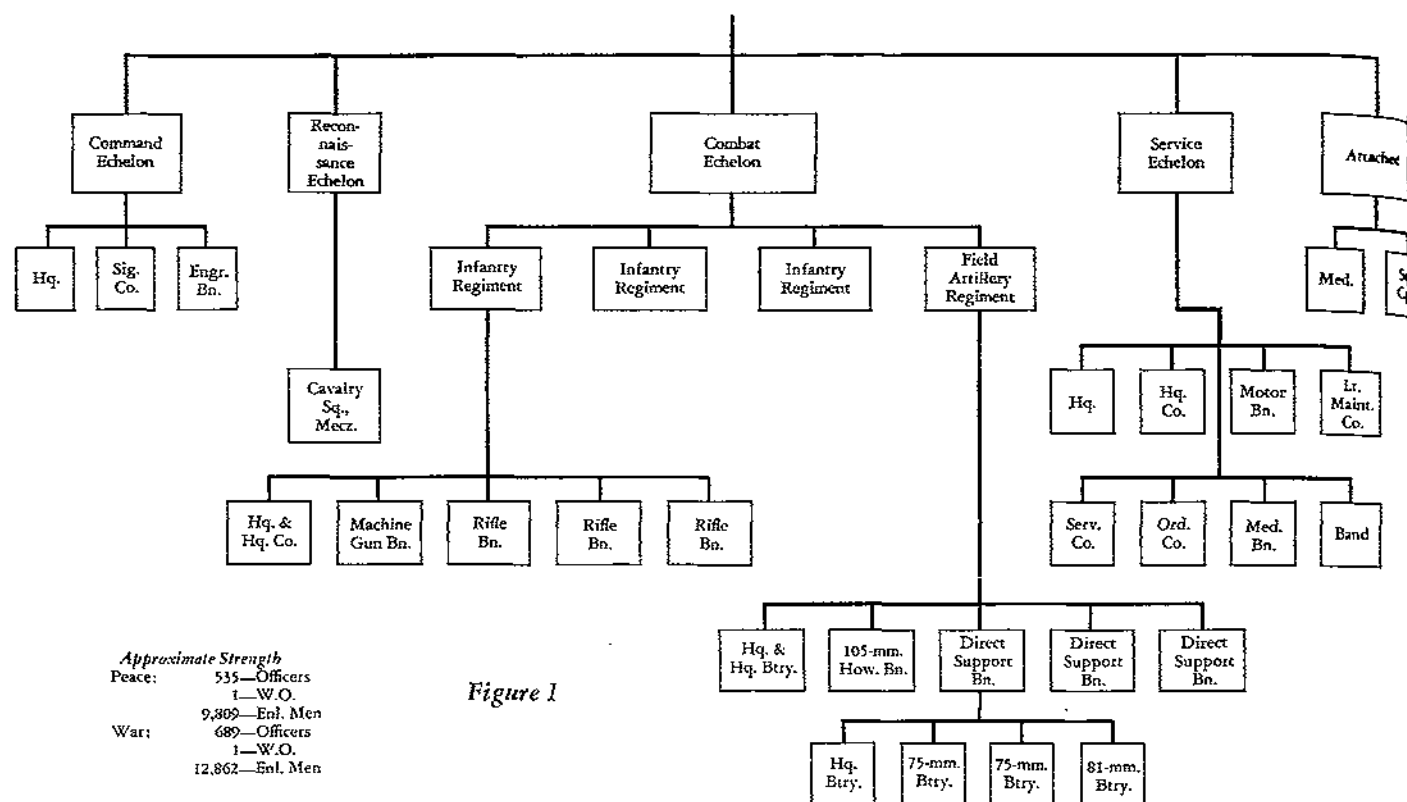


Figure 1

views on the division organization. All the European powers then had, as they now do, triangular divisions, built around three regiments of infantry and varying in strength from 12,000 to 17,000 men. As was to be expected, there was a wide difference in the recommendations received from throughout our own army. However, the great preponderance of the reports recommended a triangular organization, made highly mobile by motorization, and much smaller than our old division.

On the basis of the above data the committee submitted a proposed division organization with recommendations that it be tested theoretically in the schools by means of map exercises and problems, submitted to chiefs of arms and services and corps area commanders for study and comment, and tested practically in the field by assembling such a division in the Eighth Corps Area. The committee report was approved and these recommendations were carried out. The tentative organization which was then tested as outlined above is shown in Figure 1.

For the practical field-service test a complete division, organized in this manner, with an antiaircraft battalion and antitank battalion attached, was assembled in the Eighth Corps Area and engaged in maneuvers for a period of two months. The reports on the field-service test, on the theoretical tests in the schools, and on the studies made under the direction of the corps area commanders, with one exception, all recommended the adoption of a small division following the general organization of the division proposed. However, as a result of the studies and the tests—particularly the field-service test—the follow-

ing major defects in the proposed organization came to light:

(1) The subdivision of the organization into command, reconnaissance, combat, and service echelons served no useful purpose but tended only to complicate it.

(2) The services of a mechanized cavalry unit were highly desirable in many situations, but a whole squadron was not required for a single division. Since a squadron could perform distant reconnaissance over a front of twenty-five to thirty-five miles, one per corps appeared to be better.

(3) The 81-mm. mortar, which, in the proposed organization, was handled by the artillery, was definitely an infantry weapon and should be assigned to infantry battalions.

(4) Heavy machine guns, which, in the proposed organization, were placed in a machine-gun battalion, should be organically included in the rifle battalions.

(5) There was not enough artillery.

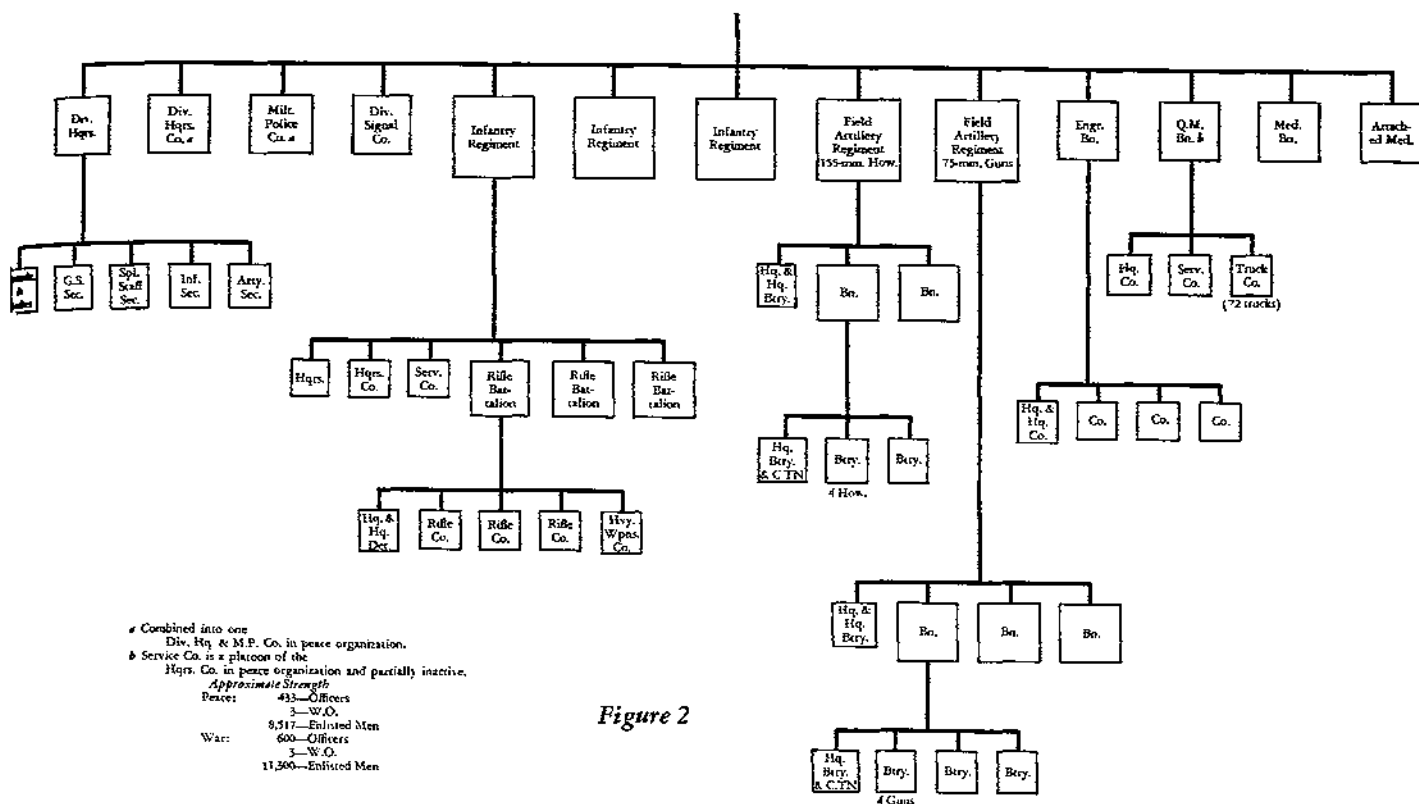
(6) The proposed organization authorized 1,866 motor vehicles. This was about twice the number required.

(7) The organization of the services in a single echelon under a general officer was unnecessary; it merely introduced another headquarters between the division commander and the commanders of his essential services.

(8) The ordnance maintenance company could maintain the equipment of more than one division and should accordingly be shifted to the corps.

Reports from the schools and the corps area commanders generally questioned the unusually large artillery regiment

The New Division



of four battalions and recommended that it be broken into two regiments. But no difficulty was experienced in handling the regiment during the field service test, the report on which recommends that the divisional artillery be a single four-battalion regiment.

When reports from all sources had been received, they were briefed, analyzed, and studied. On the basis of these data the division organization was redesigned and again submitted to the Chief of Staff. The Chief of Staff then directed that the 2d Division be organized under the revised organization for approximately a year in order to test its suitability for training and tactical operations further. This was done, the year's trial culminating with field exercises involving the complete division for a period of three weeks. From the reports of this second practical test the division was again revised to form the organization shown in Figure 2 which has now been approved by the Secretary of War.

Our military policy in the United States is based upon a small active force composed of the Regular Army and the National Guard, and an inactive Organized Reserve. With our peacetime active Regular Army as small as it is, we can maintain only a very limited number of divisions. If we have a large division we cannot maintain any of them at more than half the strength required for combat and therefore must accept an expansion of approximately 100% after M-Day. If we have small divisions, each a complete combat unit, we can maintain them much more nearly at the minimum strength required for combat, and their M-Day expansion can be reduced to a point

where it can be met by the newly created Regular Army Reserve.

The peace organization, at least as far as the major units are concerned, should be the same as the war organization, even though it contains fewer men. Expansion to war strength then requires only an increase in the strength of active elements and does not require the organization of inactive elements.

In modern warfare a division normally operates as a part of a large force. It is exceptional for one to operate alone. The triangular division is designed to operate as part of a larger force. It is capable of independent action, but given an independent mission it will usually require attachment of service troops and transportation, and possibly engineers.

Only the transportation and weapons required for practically any operation should be organically included in the division. Transportation and weapons required for special operations—contingent equipment—should come from the higher echelons when it is required. For example, no attempt should be made to organically assign to a division all the artillery it will require for an attack against a highly organized position. To include so much artillery organically in the division would be very wasteful of artillery and tend to immobilize the division. It is better to reinforce it with additional artillery from the corps or GHQ reserve when the division is to be so employed.

Overhead throughout the division, particularly headquarters personnel, must be kept at the minimum with which the units can function. For example, the new

division headquarters differs from that of our old division in several respects. It is smaller. The G-1 section of the general staff has been eliminated. And infantry and artillery sections have been included in the division staff each headed by a general officer.

Investigation of the duties performed by G-1 in the divisions during the World War brought out that these duties could be performed by the division adjutant, and that consequently there was no need for a G-1 section.

During the entire period the new division was under consideration, there was a great diversity of opinion—and there still is—as to the necessity for having any general officers in the division subordinate to the division commander. The French and Italian divisions include infantry and artillery generals, but we have not, in the past, had positions exactly analogous in our own army.

It is not contemplated that the infantry and artillery sections will act as separate headquarters and issue field orders to the divisional infantry and artillery. They may participate in preparing division orders, or even write the portions that direct the action of their respective arms if the division commander desires. But the order of the division commander will make direct dispositions of the regiments to be executed by the regimental commanders.

The major duties of the chiefs of the infantry and artillery sections will be to plan, coordinate and supervise the training of their arms; to advise the division commander on the use of their arms; and to assist the division commander as he may otherwise direct. The infantry general may be ordered to command the assault echelon or important mixed detachments, such as advance, rear, or flank guards, or enveloping forces. The artillery section will be charged with coordinating artillery fire, particularly with handling reinforcing artillery and coordinating its fires with those of the organic artillery.

When they are exercising such command functions as the division commander directs, the infantry and artillery generals will normally be located at division headquarters and will use the division signal system to all the regiments for their communications needs. If the division commander orders one of them on a mission that requires him to establish a command post separate from that of the division, his communications requirements will be provided by the division signal company.

The organization of the division signal company remains practically the same as in the old division. In the new organization it must provide, operate, and maintain communications channels to five immediately subordinate headquarters, and between these headquarters, instead of only three.

The infantry regiments are organized in accordance with Table of Organization 7-11. This organization was approved about a year ago and the regiment and its tactics were discussed by the Chief of Infantry in *The INFANTRY JOURNAL* for January-February, 1939.

The organization of the division artillery has been the subject of wide experimentation. In our old division the artillery organization was extravagant of personnel, re-

quiring within the division alone at war strength seventy-eight officers and men per gun to maintain an artillery support of 5.9 guns per 1,000 infantry. With motorized artillery in our old division this is reduced to fifty-nine officers and men per gun. In the new division, artillery overhead is materially reduced and at war strength is approximately forty-two men per gun to maintain an artillery support of seven-plus guns per 1,000 infantry. The light artillery regiment is organized into three battalions, each with three firing batteries and its own combat train. This provides a battalion of twelve guns for the direct support of each infantry regiment, as in the old division.

The medium artillery, 155-mm. howitzer regiment, is provided for general support of the division and to reinforce the fires of the direct support battalions as required. It is a two-battalion regiment, each battalion containing two firing batteries and its own combat train. This organization would be more economical if each battalion had three firing batteries, for this would provide more fire power with practically the same overhead. However, this would give a small division more medium artillery than is warranted. It is better to reinforce the division with medium artillery when the tactical situation demands it. At one time, it was believed desirable to replace the divisional 155-mm. howitzers by 105-mm. howitzers. But today the trend is toward heavier calibers, and it is now probable that if the 105-mm. howitzer is introduced into the division, it will be a replacement for the 75-mm. gun, and not for the 155-mm. howitzer.

The organization of the engineer battalion is based upon the transfer of certain engineer duties from the division to higher echelons. All heavy road work, map reproduction, and floating-bridge construction, including footbridges, are now transferred to the corps or higher echelons. The engineer battalion is organized for the primary duties of engineer reconnaissance, improvement and maintenance of existing roads and trails, strengthening of bridges, demolitions, mine and obstacle defense against mechanized attacks, field fortifications, and the transportation and issue of tools.

The universal use of motor ambulances, with their greater range and speed of movement, has made it desirable to shift the hospital station and hospital companies entirely out of the division, retaining only enough medical personnel for a dispensary service when the division is back of the lines, and to operate facilities for shock treatment during combat. The principal duties of the medical battalion are collection and evacuation of the wounded to hospital stations established and administered by the corps. Provision is made for litter-bearer units to evacuate wounded from aid stations to collecting stations and for motor ambulances to remove them to hospital stations established by the corps. Attached medical personnel in the infantry regiment has been materially increased over that in the old division and has been kept about the same as before in the other divisional units. A medical detachment of forty-eight men was attached to the large infantry regiment in the AEF. Data collected during the study

of the new division organization indicated that this was far too few in combat and the detachment has therefore been increased to ninety-six attached medical enlisted men for a regiment considerably smaller than those of the AEF.

A number of considerations influence the organization of the quartermaster battalion. In the first place, only the transportation needed for continuous use should be organically assigned to the division. No ammunition beyond that in the unit combat trains, prime movers, and weapons carriers, and that on the soldier, need be carried in the division. At the beginning of the ration cycle, there should be one and one-third rations on the kitchen trucks. One reserve ration should be carried in trailers in the quartermaster battalion, and no other rations need normally be carried. No gas and oil beyond that in vehicle tanks and in containers on vehicles need be normally carried in the division. A gas-and-oil service must be provided at the railhead for refilling. When it is desired to move the entire division by motors, or when the division is assigned a mission that requires it to carry extra ammunition or Class I supplies, additional transportation should be provided from a higher unit.

It is safe to assume that a railhead, or truckhead, for the division can be established within thirty miles of the front. The quartermaster battalion should have enough transportation to deliver rations, fuel, and water from this railhead to the regimental areas during the hours of darkness. The unit combat trains will haul ammunition direct from the refilling point to the troops. In determining the quartermaster transportation required, full cognizance must always be taken of the fact that motors, in many situations, will be able to make a number of trips.

Within the division the motor-maintenance functions of the Quartermaster Corps consist principally in limited third-echelon maintenance, an inspection-and-spare-parts service, and the evacuation of disabled vehicles to repair shops established by higher echelons. No disabled vehicle that will take more than three hours or so to repair should be handled in the division. The quartermaster battalion should furnish the passenger transportation required by division headquarters, and should provide labor for the railhead and refilling point, and for burials.

The quartermaster battalion of the new division is organized to meet these many demands, and certain headquarters, motor maintenance, gasoline and oil supply, labor, and truck units. To conserve overhead several of these units are consolidated in the headquarters company for administration, mess, and supply. The delivery of rations every twenty-four hours will require about thirty tons of cargo transportation in the peace organization and 40 tons in the war organization. In order to handle this, and also provide a small emergency pool, forty-eight $1\frac{1}{2}$ -ton cargo trucks are allowed for the peace-strength truck company and seventy-two for the war-strength. In addition, enough three-quarter-ton trailers are included to carry one reserve ration for the entire division. Trailers are preferable to trucks for this purpose because

the reserve ration does not have to be unloaded, and is thus a truly rolling reserve that can move with the division or stay behind to be brought up as needed or whenever trucks are available for towing.

It was found by extensive and thorough field-service tests that the present division ordnance company had a maintenance capacity far in excess of the requirements of this small division. It was therefore apparent that this company should be transferred to a higher echelon, where it could handle the ordnance maintenance for more than one division. An ordnance section is included, however, in the division headquarters company, mainly to operate the ammunition refilling point (the labor is to come from the quartermaster service company), the ammunition control point, the division ordnance office, and an inspection and limited spare-parts service, and to supervise ordnance supply. Unit commanders are responsible for their ammunition supply from the refilling point, using their combat trains for the purpose.

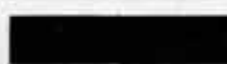
The division headquarters company and military police company are designed to carry out the same functions as they have in the past. They are combined into a single unit in the peace organization in order to reduce administrative overhead.

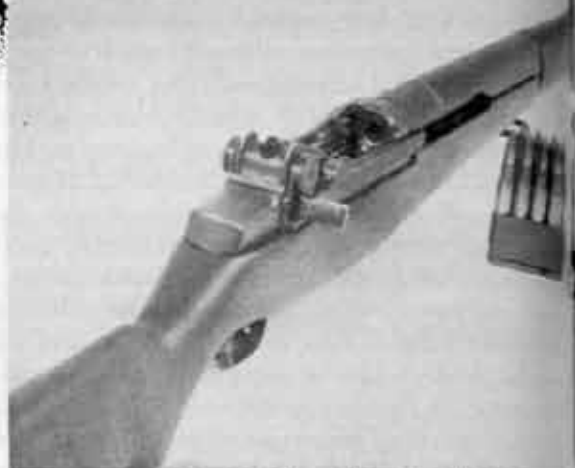
The transportation of the division is completely motorized. Through the whole period of considering and testing this organization, the question of retaining animal transportation has been much less controversial than was expected. The great preponderance of reports favored motorization of the division transportation.

The press has generally referred to the triangular division as a "motorized division." It is not a motorized division. The Army definition of a motorized unit is one that has enough motors to move all personnel and equipment at the same time. In the triangular division the infantry walks, as in the past. What has been done is to replace animal-drawn transportation and riding horses and mules with motors. The entire division with all of its ammunition and equipment cannot be moved by motors at one time without additional transportation furnished for the move.

At the same time, movement of the entire division by motor has been greatly facilitated by eliminating animals. In a division containing animals, it was impossible to utilize the mobility of motors fully because, even with an ample number available, the division could not move more than twenty or twenty-five miles per day—the marching capacity of the animals. A few animals can be entrucked in vans and move with the speed of a motor column, but it is impracticable to move all the animals that were formerly assigned to the square division in this manner. Even though the entire division, carrying its normal load of ammunition, cannot be entrucked without additional vehicles, it nevertheless has, with its organic transportation only, a considerable mobility. By shuttling it can march at least forty miles per day and maintain this rate day after day. And in a movement where there is no danger of enemy interference, and all combat-train loads

 OLD
DIVISION

 NEW
DIVISION



RIFLES .30 CAL. SEMI-AUTOMATIC

 0

 81

 0

 108

 144

 144

 12 (3" STOKES MORTARS)

 18

Major Armament of New



60-MM MORTARS



.30 CAL. LIGHT MACHINE GUNS



.30 CAL. HEAVY MACHINE GUNS



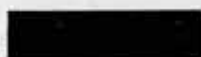
81-MM MORTARS

0

OLD
DIVISION



NEW
DIVISION



4773

12 (MODEL 1917)



18



37-MM ANTITANK GUNS

0



18

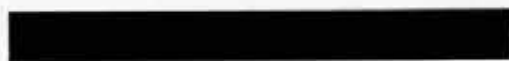


.50 CAL. MACHINE GUNS

48



36



75-MM GUNS

24



16



155-MM HOWITZERS

and Old Division

can be dumped and ammunition vehicles used for troops, the whole division can be entrucked. In one of the marches during the first field-service test of the organization, the entire division broke camp, ate breakfast, entrucked, moved 345 miles, and had the tail of its column in its new area in sixteen hours' time.

There were, of course, a number of major reasons that led to the decision to motorize the division transportation completely. To begin with, the original directive of the Chief of Staff stipulated that, whatever organization was adopted, its speed of movement must not be restricted to that of the foot soldier or horseman. Again, the experience of the Army since 1934, when a large degree of motorization became effective, has conclusively demonstrated that the modern truck has remarkable cross-country mobility. The extensive field tests conducted with the triangular division, and tests of smaller units of all arms all over the Army, have similarly demonstrated that the modern all-wheel-drive truck has a cross-country mobility at least equal to any other wheeled vehicle.

The mission of the War Department was to design an organization for the future, as well as for the present. Animal transportation is at a standstill. It has today all the faults and virtues—and it has many virtues—that it had a thousand years ago. No material improvement is possible. Motor transportation, on the other hand, is gradually improving each year. It is only necessary to look back and compare a World War truck—or even one of ten years ago—with a modern motor vehicle. And five years from now, they will be still more improved structurally and mechanically over the present models.

There are still further reasons of importance. The development and standardization of a satisfactory motor weapons-and-ammunition carrier made it possible to eliminate mule-drawn carts for infantry weapons. Motor transportation over a period of five years or longer, taking into consideration first cost, depreciation, maintenance and operation, is considerably less expensive than animal-drawn transportation. And finally, the United States has more motor vehicles than all the other major powers put together and has by far the greatest motor industry. It is incumbent on the Army, and moreover thoroughly sensible, to utilize our national resources.

In our army the so-called peace organization and peace strength are important. They form the initial organization and strength for combat. No great reserve of trained men is available; hence, the peace organization cannot be expanded to war strength until a considerable time after M-Day. When this expansion comes it will occur in the midst of war, and it should not cause a reorganization. Consequently the peace organizations of all major units in the triangular division are the same as the war organizations, though the subordinate elements may be smaller in size. For example, rifle companies have four platoons in both peace and war organizations, and the rifle platoons three squads, though at peace strength the squad has only eight men. The expansion of the infantry regiment from peace to war strength does not require the activation of

any new elements but is chiefly accomplished merely by adding four men to each rifle squad and making small increases in the strength of some of the special-weapon squads. Since ammunition-carrying personnel requires but little training, artillery combat trains and infantry ammunition sections, though a part of the peace organization, will not normally be active in time of peace, but will be activated on M-Day.

The question as to whether this new organization necessitates any material change in our tactical doctrine is an important one. After working with the new organization for a period of over five months, the Army War College, the Command & General Staff School, the Infantry School, and the Field Artillery School, all reported that the triangular organization did not make any material change in our established tactical principles or doctrine and their application. It will, however, undoubtedly necessitate considerable revision of textbooks and instructional material.

The slowness with which the square division reacted to orders has long been a cause of worry in our army. Owing to the type of organization, smaller size and the elimination of unnecessary headquarters, the triangular division reacts to orders very much quicker. The distribution alone of orders in the old division required from five to six hours. Very complete data kept during the two extensive maneuvers of the new division indicate that it reacts to orders—all troops in motion or ready to move—in approximately two hours.

The ability to sustain combat has been a major consideration throughout the study of this organization. The ability of any division to stay in the line in a defensive situation and to continue its advance in offense is largely determined by the amount and effectiveness of supporting artillery and by the number of infantry battalions that can be initially held in reserve. The artillery support in the new division is as strong as in the old, but there are only nine infantry battalions as against twelve. But the new battalions, it should be noted, are smaller than the old. It is probable, therefore, that a single triangular division does not have the same ability to sustain combat as did the old square division. However, it must be remembered that in modern war the power to sustain combat, either offensive or defensive, on a given front is not determined by single divisions. It is determined by the organization of the corps or even armies on that front. The problem of organizing for sustained combat is not that of the organization of a single division. It is a problem of how best to organize, say, 50,000-60,000 men, in order to secure the maximum of sustained effort. A corps consisting of corps troops and three of the new divisions will aggregate about 50,000 men. A corps containing two of the old divisions will aggregate about 60,000 men. The artillery support is the same in both cases and the front about the same. However, the corps made up of the new smaller divisions has twenty-seven battalions of infantry as against only twenty-four in the other corps. Again it must be remembered that these new type battalions are

smaller than the old battalions. Therefore, the corps of the new divisions, though numerically smaller by approximately 10,000 men, has—it is believed—a staying power at least equal and probably greater than the one organized with the old division.

The major armament of the new division is shown graphically on page 526, and is compared with similar armament of the old division. It may be noted that many weapons, notably the single-shot rifle and Browning automatic rifle, have been eliminated and a number of new weapons introduced. In most infantry regiments, the modified Browning automatic rifle, with bipod, butt-plate, and cyclic-rate device, is now used as a substitute for the light machine gun until sufficient machine guns can be supplied. The modified Browning automatic rifle is proving to be such a valuable weapon that it will probably be retained even after light machine guns are available for its replacement. At present it is not included in the armament of the divisional infantry, and just where it will be used if retained has not been finally determined.

It has not been the purpose of this article to discuss the

tactics for the employment of this division, but simply its organization. However, it is pertinent to point out that the organization is designed to move and fight in combat teams, each consisting of a regiment of infantry and a battalion of light artillery. In so far as possible there should be an element of permanency in these teams, the same battalion of artillery always being associated with and supporting the same regiment of infantry. Combat teams thus constituted are small and compact enough to camp, move, and fight together. They furnish a combat unit small enough to be easily handled but of great power.

Probably none of the many officers who have worked on this organization or assisted in the numerous tests of it ever had any ambition to produce a perfect organization. In fact, a military organization that is perfect under all the varying conditions of warfare does not and never will exist. However, the writer believes that the new United States division is superior to our old division. It is modern and its organization will permit the maximum employment of improved weapons and modern means of transportation.



LIGHT AA GUNS AT THE FRONT

This official British picture shows an anti-aircraft crew "somewhere in France."

Seein' IS BELIEVIN'

By Captain
EDWARD
BARBER
Coast Artillery Corps

Self-contained range finders have been in use throughout armies and navies for many years. Until about twenty years ago, our own Navy and Coast Artillery Corps used the coincidence-type range finder exclusively and our experience with the stereoscopic type was practically negligible. This may seem strange when we reflect that both types were conceived at about the same time, shortly after the close of the War between the States. Years ago, the phenomena of stereoscopic, or binocular, vision, although not thoroughly understood, were widely recognized and may be witnessed by the fact that no home was complete without its parlor stereoscope and a set of picture cards.

At the time of my entry into the service, one of the current topics for discussion in the Coast Artillery Corps was the Battle of Jutland. Available reports indicated that the use of stereoscopic range finders was largely responsible for the gunnery successes of the German



Figure 1:
Stereoscopic Tester M1.

Navy. Also, it was reported that in order to obtain the mere handful of observers required, every man in the German Navy was tested for his stereoscopic ability. This report was widely interpreted to mean that only one man in five hundred was capable of becoming a good stereoscopic observer. Although, in my opinion, the report is now considered to be a clever bit of post-war propaganda, for a number of years it had marked effect upon our attitude toward the stereoscopic range finder. This attitude is clearly indicated in an instructor's notes at the Coast Artillery School in 1931:

STEREOSCOPIC HEIGHT FINDERS

Disadvantages.

Hard to obtain and train reliable observers. A soldier is apt to have his position go to his head. Observer should be an officer, but comparatively few officers have the proper eyesight.

Thus was the mystery of the stereoscopic height finder preserved and a halo placed upon the brow of that superman, the stereo observer.

During the World War and until 1925, our antiaircraft service used the two-station altimeter to determine altitudes. In 1925, the need for a self-contained height finder became clearly recognized and as a result, several were obtained for test at Aberdeen Proving Ground in 1926. The development and test of height finders continued for several years. Complete reports of the tests at Aberdeen Proving Ground are available and these contain much data of interest to the Corps. A few extracts of these reports are quoted in order to partially justify our reluctance, and even refusal in most cases, to accept the stereoscopic height finder as a member of our family of antiaircraft fire control instruments in good standing.

In 1926.

The disadvantages of the stereoscopic height finder are:

- Because of the stereoscopic principle, a highly skilled operator is required.
- The judgment of the operator is involved, and therefore is subject to error.
- It is an optical instrument requiring expert maintenance.
- It cannot be used in trial shot firing, the bursts being too poorly defined to permit of accurate readings.
- It is heavy and must be transported with care.
- It is not procurable cheaply and quickly.

In 1927.

The accuracy of the height finder tested is not satisfactory.

In 1928.

The conclusions drawn from a study of the results of the accuracy tests of x x x range and height finders are as follows:

- a. That the stereoscopic type height finder is superior in accuracy to the coincidence type.
- b. That to attain an appreciable increase in the accuracy of fire a more accurate altitude measuring instrument must be employed.
- c. That a height finder of not less than an 8-meter base will be necessary to meet the future demands of 3-inch and 105-mm. antiaircraft gun batteries.
- d. That the mean absolute error that may be expected of the best 4-meter base height finder is about seventy-five yards at an altitude of 4,000 yards.

It was recommended that the stereoscopic-type height finder be adopted as standard.

In 1932.

Without the use of a method of calibration, the two height finders give dependable readings only within the following limits:

T₉ (4-meter) to a slant range of 2,500 yards.

T₁₂ (6-meter) to a slant range of 3,500 yards.

These values are based upon the hypothesis that the maximum error in slant range allowed should be 100 yards.

The best hope of success in developing an accurate height finder seems to lie in the field of the 2-station altimeter.

Small wonder then that a battery commander in the field would refuse to use a stereoscopic height finder for his annual target practice whenever he had an altimeter available. Small wonder also that he would devote very little time, if any at all, to endeavoring to train a satisfactory stereo observer.

However, the night is always the blackest just before the dawn. Be it everlastingly to the credit of that small group of men who persisted in their efforts to develop a satisfactory height finder and to train competent observers, the picture now changes. The 1936 report of accuracy tests of height finders is very illuminating. Three different multi-station height finders were tested, including our old standby the M1920 altimeter, together with two stereoscopic height finders, the T₉E1 and the T16. A few pertinent extracts of the report follows:

Day Observation.

The T16 and the T₉E1, when operated by B———, were more accurate than any multi-station instrument.

Night Observation.

The T₉E1 operated by B———, gave the most accurate data of all instruments tested.

1. The accuracy of the stereoscopic instruments, obtained in this test by the most accurate observers, greatly exceeded the accuracy obtained in the 1932 test.
2. The increase in accuracy of results, it is believed is due primarily to the use of more proficient observers.

In the 1936 tests, the M1920 altimeter was most consistently ranked last in accuracy. Occasionally, one of the stereo observers, who by our present-day standards could not be considered as properly trained, was less accurate than the altimeter. No adverse comments appear in the report as to the state of training of the altimeter operators, so it must be assumed that they were competent. As a result of the 1936 tests, the Stereoscopic Height Finder, T₉E1, was standardized as the Stereoscopic Height Finder, M1, and is now being purchased in quantity.

Now that the stereoscopic height finder has been officially recognized as a member in good standing of the antiaircraft fire control family, how is it being received? In one group, those of us who have enlarged our acquaintance by working and playing with it, think it is a "swell" instrument. Whenever it is available, we prefer to work with it rather than the two-station altimeter. In a second group are those who still prefer the two-station altimeter despite the proven superiority of the stereoscopic instrument. In a third group are those who have yet to learn about the stereoscopic instrument and its capabilities. What is being done about this? Well, nothing need

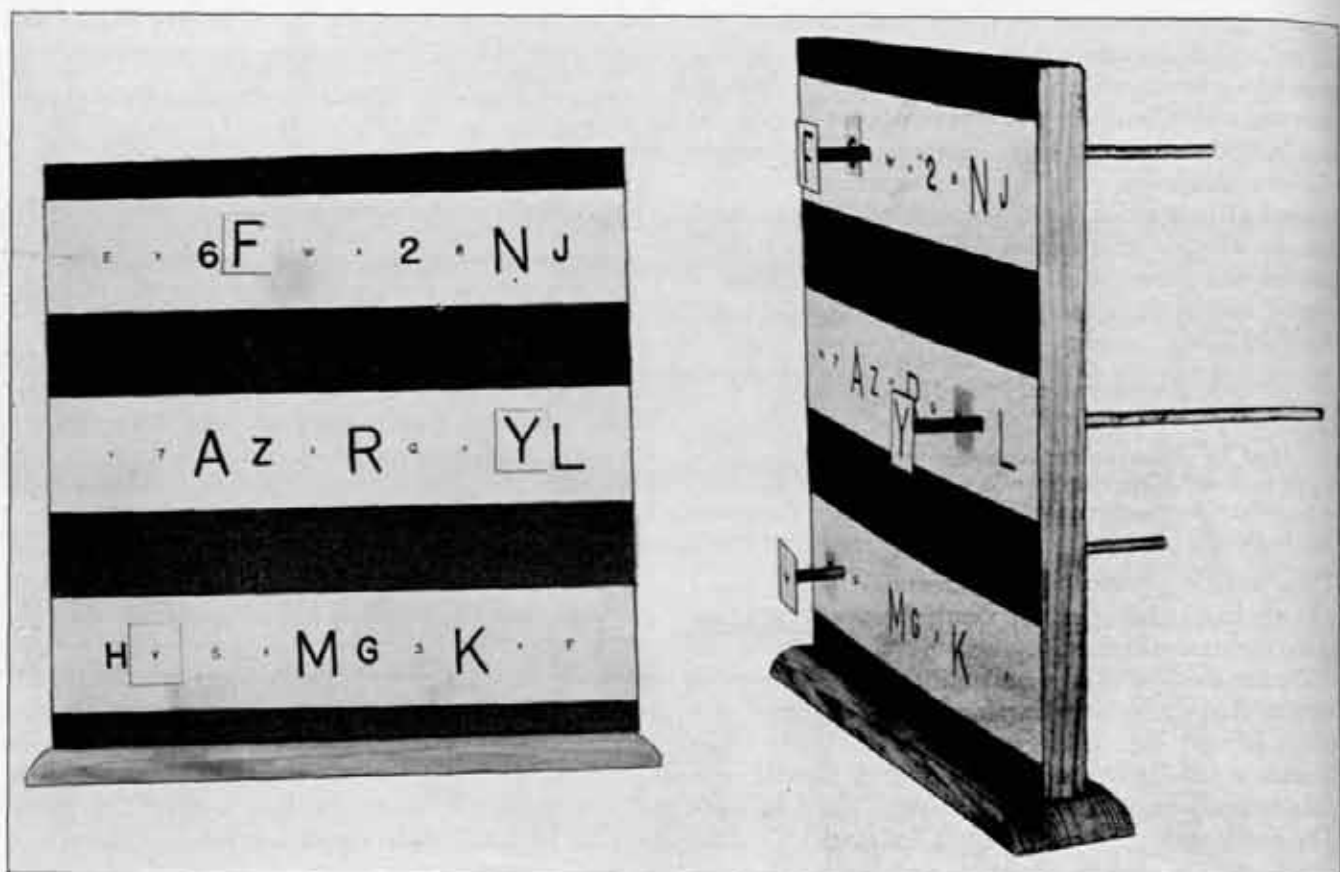


Figure 2. Stereoscopic Training Device

be done about the first group, as they like the stereoscopic instrument and will spread the gospel far and wide. For the second group, nothing much can be done. For the third group, a few are being introduced to it each year at the Coast Artillery School with about fifteen hours of instruction and practical work as compared with about fifteen minutes of very perfunctory remarks some ten years ago. This is in addition to regimental schools for observers in which a great deal of interest is being taken at the present time. What has made this extended introduction possible? Aside from the increased time made available in the School curriculum, probably the biggest single thing has been the preparation and publication of the Coast Artillery School text "Stereoscopy and Stereoscopic Range Finding." Although notes in fragmentary form have been published previously, for the first time the Coast Artillery Corps has available a reference text which covers the field of stereoscopic range finding in a very comprehensive manner and in language easily understood. The man responsible for the preparation of this text unquestionably deserves another star in his crown, and will doubtless receive his reward upon arrival at the pearly gates. Figuratively speaking, he picked up the ball behind his own goal line and ran with it all the way down the field to the five-yard line where he was tackled and thrown by Deadline, the nemesis of authors and reporters. In this article, your reporter will endeavor to carry the ball two yards farther, to the three-yard-line. Some repetition will be unavoidable and the ball may be fumbled

behind the line of scrimmage, but maybe a vague point or two may be cleared up and maybe a helpful idea will appear. What follows is intended to supplement the excellent text mentioned previously.

Without going into all the details in explanation of why we can see stereoscopically, a simple but somewhat lengthy explanation, the reader is asked to accept the fact that everyone with two normal seeing eyes has stereoscopic vision. All that we need to be able to operate a height finder of the stereoscopic type is EXPERIENCE of the proper kind, and the "stereoscopic frame of mind." Since EXPERIENCE is KNOWLEDGE GAINED BY TRIAL, it is my firm conviction that the properly trained stereoscopic observer does *not* depend upon his judgment in measuring altitudes with a height finder, but rather continually works toward his own physiological limit of stereoscopic perception, and this limit can be actually measured. It is now well established that of a group of persons with normal vision, we have every reason to expect that about eighty per cent can become satisfactory stereoscopic observers, and of these, at least five per cent will be in the exceptionally proficient class.

Just how should we proceed to ferret out and utilize all this latent ability? In what way may we add to the experience of an individual to the end that he may acquire what has been called the "stereoscopic frame of mind" *before* he looks into a height finder? Fortunately, we are provided with, or can provide ourselves with, the necessary tools of the trade. There are several excellent stereo-

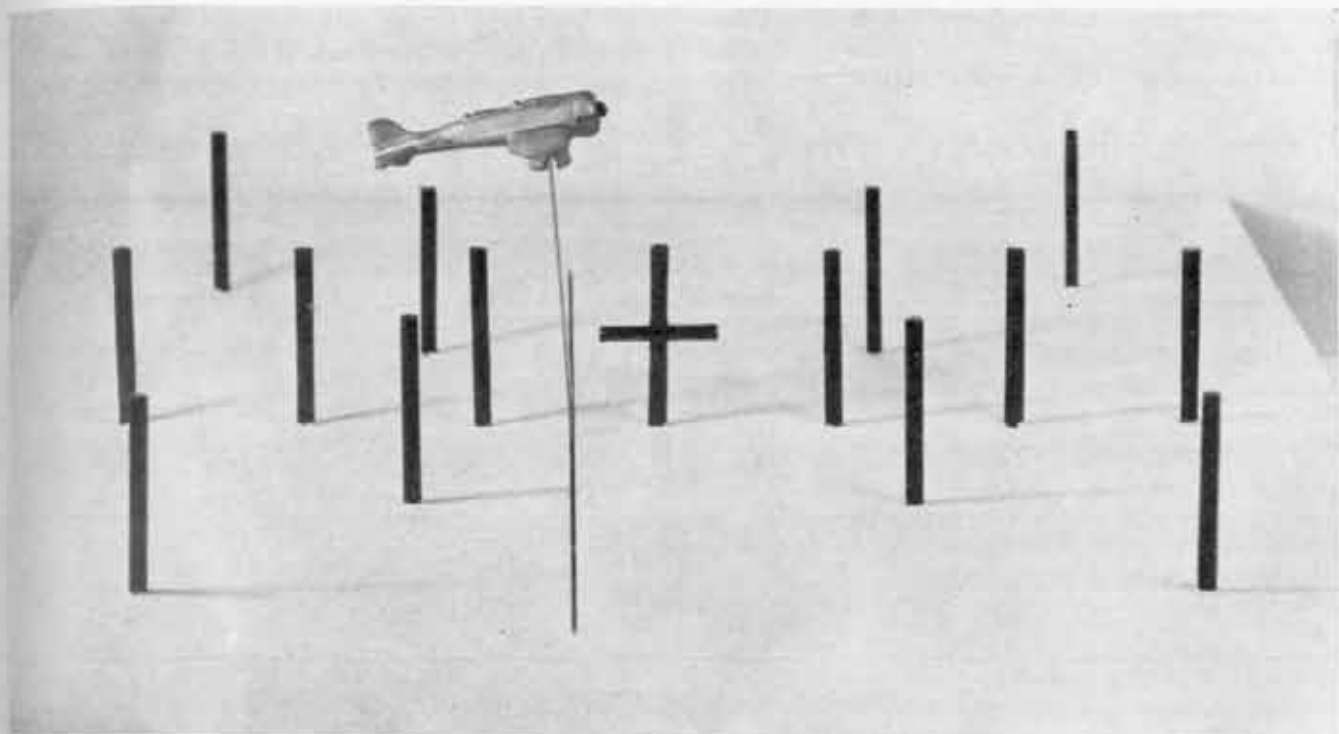


Figure 3. Stereoscopic Training Device

grams contained in the text "Stereoscopy and Stereoscopic Range Finding" which provide image fusing exercises. In this connection it has been found helpful to observer candidates to reproduce these stereograms on clear xylonite, enabling them to fix the gaze on objects beyond the stereogram rather than trust their imagination in "looking through" paper. The Stereoscopic Tester, M1, illustrated in Figure 1, is a portable self-contained instrument which is particularly well adapted to testing and selection of prospective stereo observers. It has two sets of stereograms, or slides, one set for use in revealing abnormal conditions of the eyes which tend to make stereoscopic observation difficult, and another set of 23 slides for use in quantitative measurements of stereo-acuity for convergence. A handbook, furnished with each instrument, contains complete instructions for its use and how to analyze the results of the tests. The second set of slides is of interest. Each slide contains three rows of numbers or letters. The first slide of this set is shown in place in the tester in Figure 1. These rows of numbers and letters are photographed stereoscopically at measured distances, one letter or number in each row being brought forward a definite distance. A number of candidates have difficulty in reading even the first of these slides. There is apparently nothing in their past experience which would guide their minds to a correct interpretation of what they see. Looking at the slide alone furnishes no clue as to how it should appear when viewed in the tester. Before we reject these candidates as devoid of stereoscopic ability, let us take advantage of this opportunity to provide them with experience of the proper kind. In Figure 2, there is illustrated a simple device which can be made by any battery mechanic. It reproduces, in an enlarged (12 x

12") single-image form, the picture on the first slide of the set. The appropriate letters are actually brought forward on small rods and serve to provide a representation of what should be seen in the tester. The experience gained by the candidate in viewing this device generally proves helpful in correctly interpreting what he sees in the tester. The device can be utilized to a limited extent in preliminary training by advancing each letter a different amount and requiring the candidate to determine with his unaided eyes, from a distance of about ten feet, which is the nearer. In addition to being used principally for testing and selecting candidates, the M1 Tester has considerable value as a means for strengthening the muscles of the eyes and providing mildly corrective exercises for abnormal muscle conditions. All men in an organization should be encouraged to make use of the tester by keeping it in the battery dayroom where it is always available and where its use may be supervised by the charge-of-quarters or the dayroom orderly. Excellent observer material may be developed frequently with little effort on

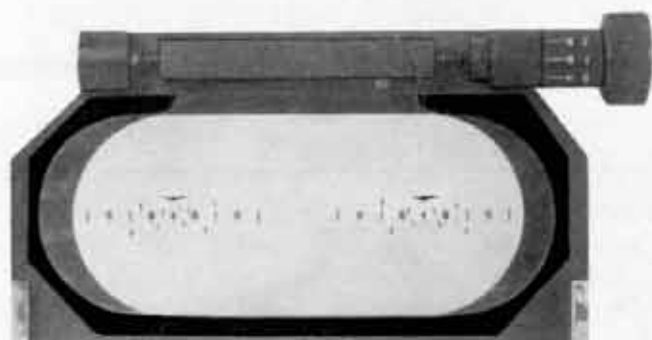


Figure 4. Stereoscopic Training Device (Cricblow)

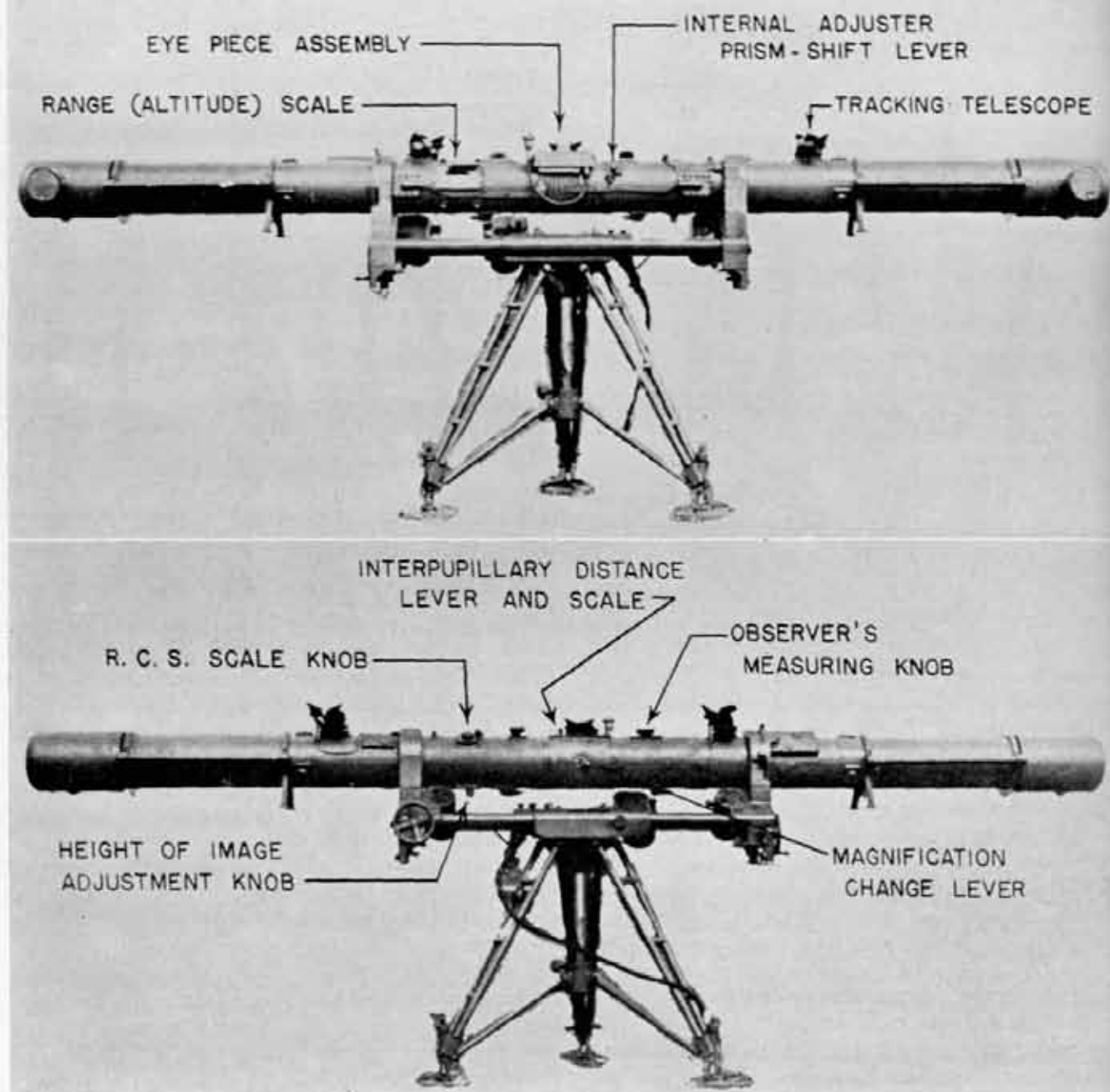


Figure 5. Stereoscopic Height Finder, M1

the part of the battery commander other than analysis of the recorded results of tests.

After a candidate passes all the tests creditably, there is no assurance that he will become a successful stereo observer. There are several rough spots ahead that may need smoothing out. When he looks into a height finder he may still have difficulty in "getting the picture." Here then is another opportunity to provide him with experience of the kind which will smooth the way for him before he attempts to work with the height finder. In Figure 3, there is illustrated another simple device which may be made up by any battery mechanic. In a piece of $\frac{1}{2}$ " plywood, 30 x 42", there are inserted several $\frac{1}{4}$ " x $3\frac{1}{2}$ " dowels in such a pattern as to represent a height finder

reticle. A miniature airplane, obtainable in any 10-cent store, is mounted on a piece of xylonite. The xylonite moves in a slot in the board in such a manner as to represent the movement of a target image in the height finder. This presents a reasonably credible picture of what an observer should see when operating a height finder. The device has considerable promise as a means for preliminary and indoor training. If placed at a given distance from the observer's eyes, say 20 feet, a scale can be placed along the slot, graduated in terms of seconds of arc, and a rough measure of stereo-acuity obtained. This works on the same principle as the depth-perception test given to airplane pilots. An additional device for training observers has been devised by Captain R. W. Crichlow,

fr., and described by him in the March-April issue of the *COAST ARTILLERY JOURNAL* for 1937. The device has merited its recent adoption as standard and will be issued to the service in the near future. The Ordnance pilot model of this training device is illustrated in Figure 4. It is designed for use with the M1 Tester and provides a very excellent means for indoor training.

So much for the tools of the trade which can be used in testing and selecting stereo observers and providing them with preliminary training and experience of the proper kind. The next stage in the development of an observer is actual work with the height finder, and at this point it is well to provide a little instruction, slightly tinged with propaganda, in order to build up his confidence in the instrument with which he is to work. While a complete description of the Height Finder, M1, is unnecessary here, as each instrument is accompanied by a handbook, there are several tricks of the trade worth mentioning. To begin with, that "big long tube standing on three legs" seems to be a rather mysterious affair. Why? Probably because we are unable to see just what is going on inside the tube. We seldom puzzle over the interior of an ordinary observing telescope, and yet most of the glassware inside a height finder is devoted to providing an observing telescope for each eye. Much of the remaining glassware is for the purpose of adjusting the instrument to fit the observer's eyes, and the last few pieces are contained in an optical compensator which enables the observer to actually measure the range or altitude. To those who desire a more detailed explanation, let them be assured that a knowledge of elementary optics and plane trigonometry such as is acquired in any high school, will enable a comprehensive understanding of what happens inside that mysterious tube. Of course, the design and construction of a height finder are completely beyond the present ability of most of us, but we may all acquire an understanding sufficient to enable us to use the instrument intelligently.

Let us proceed to examine and comment upon the procedure to be followed in adjusting the Stereoscopic Height Finder, M1, to fit the eyes of an individual observer. The instrument is shown in Figure 5. The various adjustments

should be made in a logical sequence, in fact they should form part of a ritual which every observer should be required to go through *every time* he steps up to a height finder. The adjustments are of extreme importance and must be carefully made as it is quite possible that a slight error in either one may preclude successful stereo observation. After the height finder is set up and oriented, the following adjustments should be made in order:

1. *Set interpupillary distance.*

The spacing between the eyes varies, with individuals, from 60 to 70 millimeters. Each observer should determine and record his own interpupillary, or interocular distance at the beginning of his training. Up until the present time, no interpupillary gauges have been issued. In Figure 6, there is illustrated a home-made interpupillary gauge consisting of a small box-like frame, about 6 x 9", with a mirror at one end and a millimeter scale at the other. By placing the eyes at end of the box just over the scale, an individual may read in the mirror at the other end his own interpupillary distance. On the Height Finder, M1, the interpupillary adjustment scale and lever are located conveniently at the upper left-hand corner of the eyepiece plate.

2. *Adjust focus of each eyepiece.*

The diopter adjustment scales are located on each eyepiece ring, with indices on the eyepiece plate. When determining diopter settings initially, elevate the instrument so as to view the sky, then "focus in" the reticle marks to sharp definition in one eyepiece at a time, by rotating the eyepiece ring just under the open eye. While this may be done by closing first one eye and then the other, the better procedure is to make these adjustments with both eyes open, covering up first one end window and the other. Once the proper settings are determined and recorded, they may be made without going through the above procedure.

3. *Adjust head rest.*

This is accomplished by turning the head rest adjusting screw in or out to suit the individual. The proper position is one which will allow the observer to view the largest

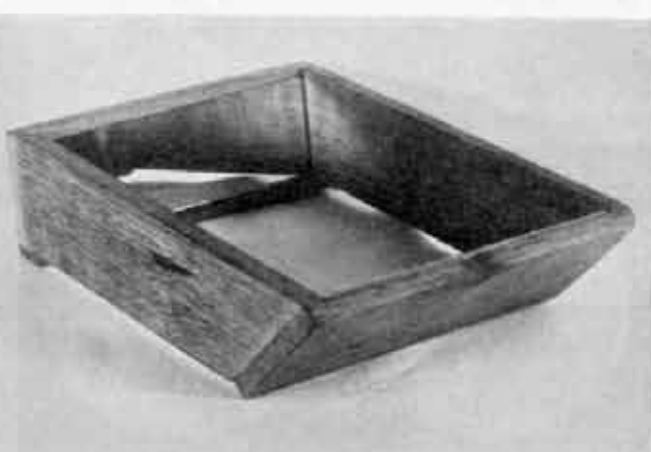
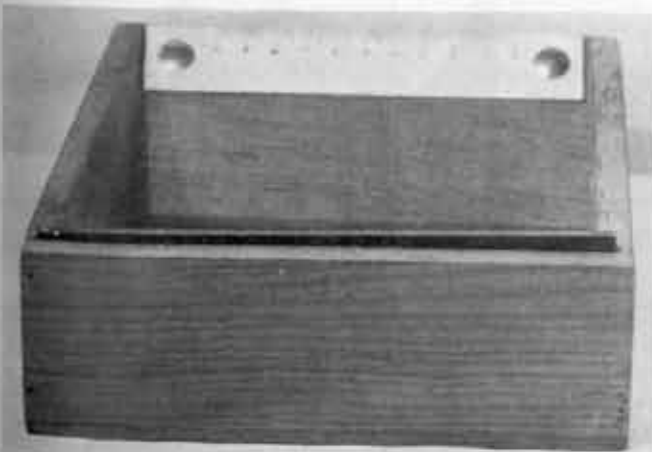


Figure 6. Interpupillary Gauge

field and yet prevent stray light interference from the edges of the rubber eye shields.

4. *Make proper Range-Corrector Setting.*

The range-corrector setting knob and scale are located on the rear side of the height finder tube to the left of the eyepiece assembly. The knob is a knurled thumb knob covered by a cap when not in use. The scale is graduated from 0 to 100, each division representing a unit of "12 seconds of arc." Average settings for individual observers will usually fall between 30 and 70. Before attempting to make any range or height readings with the instrument, it is essential that the proper range-corrector setting be made. The detailed procedure may be found in the handbook which accompanies each instrument and need not be repeated here, however the fact that it is not repeated should in no manner detract from its importance. The accuracy of an observer's readings on a target depend almost entirely upon the accuracy with which the range-corrector setting is made. In this connection, it should not be expected that all observers will have the same range-corrector setting. If they do, it is merely a coincidence.

5. *Adjust the height of image.*

The height adjustment knob is located on the under side of the height finder tube to the left of the eyepiece assembly. It is a knurled thumb knob which is covered by a cap when not in use. This adjustment should be made every time an observer uses the instrument. The procedure is to set the central reticle in the right eyepiece on some well-defined point, by means of the elevating and traversing handwheels. Then, closing the right eye, bring the image of the target to the same point on the left reticle by means of the height adjustment knob. This is a very important adjustment, and if not properly made, may prevent proper fusion of images. At least one case of severe hyperphoria, within my knowledge, has resulted from a persistent and finally successful effort to fuse target images that were not properly adjusted for height. An *improper* height adjustment is illustrated in Figure 7. This completes the procedure of adjusting the instrument to fit the observer's eyes. After following through the procedure in the proper sequence a few times, it becomes routine and actually requires much less time than it takes to read or write about it. However, its importance cannot be overemphasized. A great number of our failures to sense depth when looking into a height finder have re-

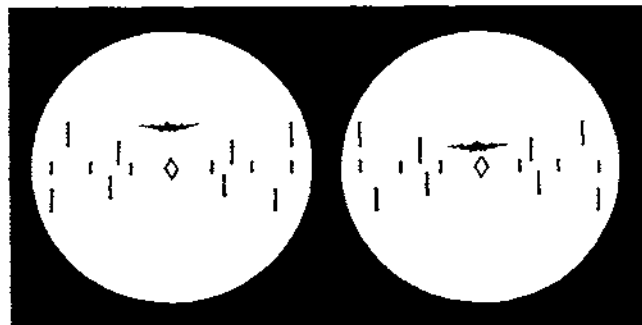


Figure 7. *Improper Height of Image Adjustment*

sulted solely from failure to adjust the instrument properly to fit our eyes.

Surprising as though it may seem at this point, a number of candidates may still have difficulty in "getting the picture," even though their preliminary training has been very carefully conducted. What to do? We mustn't give up in despair, the ability is there just waiting to be developed and made useful. What is lacking? Nothing more than experience, hence we should resort to further means of enlarging a candidate's experience so that his mind will correctly interpret what he sees. If we can present him with pictures of what he is likely to see, upon first looking into a height finder, we have helped him over several hurdles in his race down the home-stretch. The following series of pictures is designed to enlarge his experience in this respect. Assuming that the height finder has been properly adjusted, when an observer looks into the instrument and closes his left eye, he should see what is represented in Figure 8.

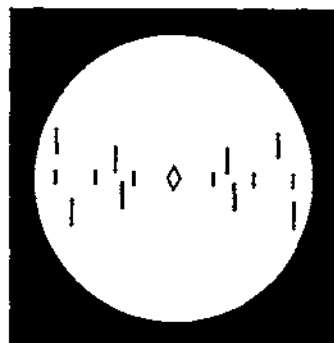


Figure 8. *Right Field of View*

If he opens his left eye and now closes his right eye, he should see what is represented in Figure 9.

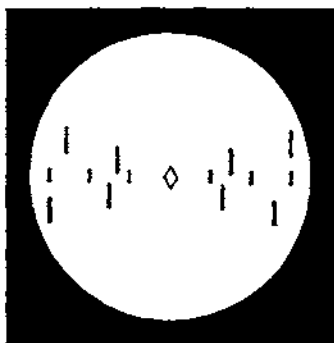


Figure 9. *Left Field of View*

If he now observes with both eyes open and the instrument is pointing at a target, he should see what is represented, as nearly as it can be pictured, in Figure 10.

The tyro observer may not "get the picture" represented in Figure 10. He may frequently see what is represented in Figure 11 or in Figure 12. If he does, it should not be taken as an indication that he has no ability as a stereoscopic observer. It is most likely that his mind, lacking experience of this nature, will not correctly inter-

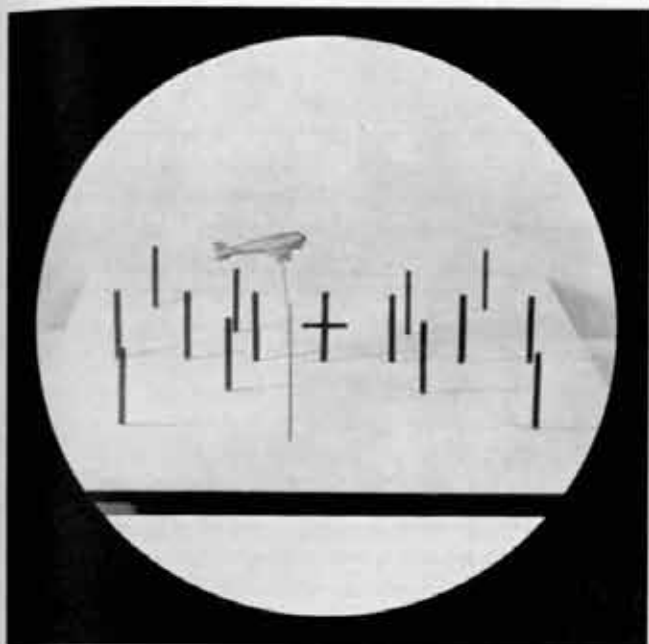


Figure 10. A Representation of the Complete Field of View

pret what he sees. Doubled or partially doubled fields of view are not a new experience for most of us, as they occur frequently when looking through ordinary binocular field glasses. The natural reaction is to adjust the spacing between the eyepieces until we get a single field of view. After an observer has carefully measured his interpupillary distance, as previously described, and made the proper setting on the height finder, there is no necessity to change the setting. In fact, it is dangerous business, for when you see an observer change the interpupillary setting while looking into the instrument, it is a safe bet that he is attempting to reduce a doubled field of view to a single one, and it is just about certain that if he does finally get a single field, he has successfully obscured the field from one eye. The better procedure is to make the proper interpupillary setting before attempting to observe, and leave it undisturbed. Continued efforts to perceive a single field of view will certainly meet with success. All that is needed is experience.

One more pitfall awaits the tyro. If he is successful in perceiving a single field of view and attempts to "range" on a target, occasionally he may see what is represented in Figure 13 or in Figure 14.

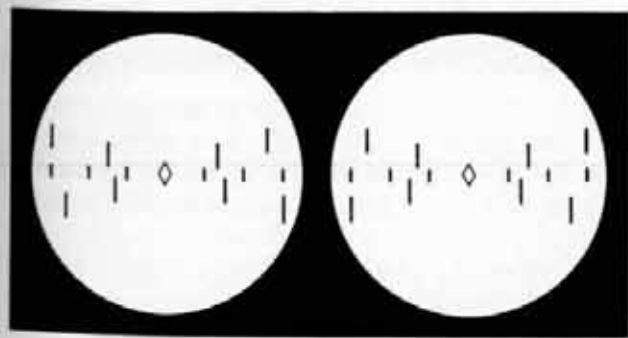


Figure 11. Doubled Field of View

These are examples of phenomena of doubled images and arise from the fact that the target image and reticle image are in widely separated distance planes, such as will occur when endeavoring to view a target at a range of 5,000 yards with the range scale on the instrument set at 15,000 yards. The better procedure during the early stages of an observer's training is for the instructor to keep the range scale setting somewhere near the actual range to the target being observed. After the observer has acquired sufficient experience, he will no longer have "double" trouble. The picture should consist of a single field of view, a single reticle image, and a single target image. When an observer "gets" this picture, and is able to sense relative motion between the target and reticle, toward and away from him, when he rotates the measuring knob, Eureka! *your* principle troubles are over. When he makes stereoscopic contact by placing the target image at the same distance away from him as the central row of reticle marks, Hallelujah! *his* troubles are over. He has actually measured a range with a stereoscopic instrument! Now he has seen and now he believes! Hence the reason for the title of this article. Henceforth his progress will be rapid and his confidence in his own ability, and in the instrument itself, will increase.

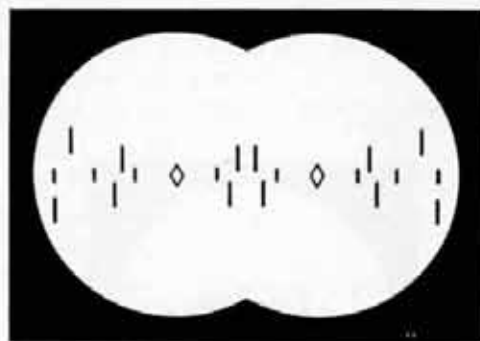


Figure 12. Partially Doubled Field of View

For the benefit of those readers who will consider that the various training aids described thus far are rather devious, silly, and far more trouble than they're worth, it must be admitted that not all observer candidates require them. They are for the sole purpose of helping those candidates who have difficulty in developing the stereoscopic frame of mind. Sometimes it is developed in a few minutes, sometimes it requires a week or two.

From now on, all an observer needs is EXPERIENCE, or has this remark been made before? There is an excellent guide for training in the text "Stereoscopy and Stereoscopic Range Finding," and hence no need for enumerating all the steps here. All training of the proper kind will serve to enlarge the experience of an observer, and it should point directly toward one thing, i.e., the determination of his proper range-corrector setting for all conditions of observation. It appears that the significance of the range-corrector setting (RCS) has just recently become fully appreciated. About 1930, a set of instructions for operating a stereo height finder was issued which specified that a

series of readings should be taken on a known datum point. If the readings did not agree with the true range, the RCS was to be changed a certain amount and another series of readings taken. And so on until by trial and error, the RCS giving the best results was finally arrived at. Later instructions specified setting the range scale to read the true range to the datum point and obtaining stereoscopic contact by means of the RCS knob, averaging the

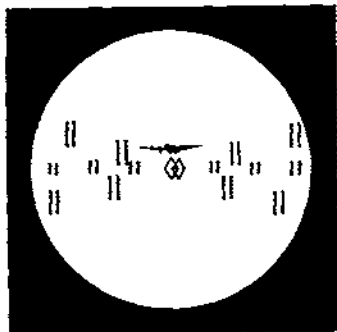


Figure 13. Doubled Reticle

series of RCS scale readings thus obtained. This followed the procedure customarily used with the coincidence-type range finder. Since the latest height finder has an internal adjuster system, there is some controversy as to the necessity for using known datum point observations to determine the proper RCS. The manufacturer claims, with pardonable pride, that the precision he has built into the

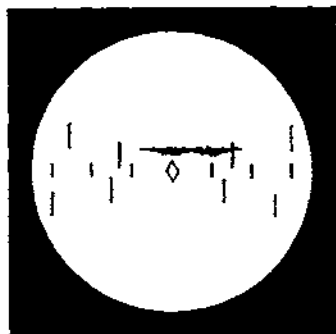


Figure 14. Doubled Target Image

instrument warrants placing sole reliance upon the RCS determined by means of the internal adjuster. While it must be admitted, in theory at least, that he is correct, nevertheless it is a fact that, within our limited experience, an RCS determined from the internal adjuster system does not always agree with the one determined from known datum point observations. The disagreement is usually small but the accumulated evidence seems to indicate that an RCS determined from datum point observations, preferably at the expected range of the target, will give better results. Just why this disagreement should occur is a matter for conjecture. As yet, there is nothing in theory to explain it, and there is insufficient evidence to indicate that the difference in RCS follows any law, or that it is dependent upon conditions of visibility or upon light in-

tensity. What is needed is more experience (that word is in again). It should become a routine procedure in peacetime that every time an observer reads a range or an altitude with a stereoscopic instrument, his readings, the conditions of visibility and light, the atmospheric temperature, and the true range should be recorded, to the end that his proper RCS's under all conditions may ultimately be determined. And why this? Because there will come a time, under field service conditions, when there is no time to use the internal adjuster, there is no known datum point available, and the accuracy of an observer's readings on a hostile airplane will depend upon his proper RCS for the conditions of the moment, as determined from his past experience.

For known datum point observations, a point which is about at the same range as the expected range to the target and which offers a background of sky, such as the top of a tower or spire, is considered most suitable for antiaircraft work. With the instrument set for use as a range finder, a series of at least five readings should be taken on the datum point. For this, the observer's measuring knob should be used instead of the RCS knob, as advocated in the past. Movement of the RCS knob changes the height of the target image in the left eyepiece. Although this change in height of image may be imperceptible, the use of the observer's measuring knob is preferred. For internal adjuster readings, a change in image height is of no consequence as the "target" is a vertical black line, hence the RCS knob is used. When the five readings are averaged, the average may not agree with the true range to the datum point. If not, a change in the RCS is indicated. The method of accomplishing this is described in "Stereoscopy and Stereoscopic Range Finding," but it is considered to be of sufficient importance to warrant repetition. Consider the specific problem which follows:

Actual range to datum point (R)	5000 yards.
Observed range to datum point	5050 yards.
Range error (dR)	+ 50 yards.
Instrument base (B)	4.5 yards.
Magnification (M)	24 power.
RCS (internal adjuster)	41

Reduce the error in yards to "seconds of arc," by substituting in the expression—

$$d \alpha = \frac{B \times M \times 206265 \times dR}{R^2}$$

where the numeric "206265" is used to convert radians to seconds of arc.

$$d \alpha = + 44 \text{ seconds of arc.}$$

Recalling that the value of a single unit graduation on the RCS scale is "12 seconds of arc," the RCS should be changed $+ 44 \div 12 = 3.7$ units. Hence the new RCS should

be 44.7. There are tables contained in the text "Stereoscopy and Stereoscopic Range Finding," which obviate the necessity for the above detailed calculation, but a specific example helps the use of the tables. When dealing with

altitudes, the following expression may be used to determine the observer's error in seconds of arc:

$$d \propto \frac{B \times M \times 206265 \times dH \times \sin \epsilon}{H^2}$$

where H and dH are the altitude and altitude error respectively. This equation appears in substantially the same form in the recent issue of TM 2160-35, "Coast Artillery Target Practice." Why reduce all errors to "seconds of arc" in stereoscopic range or height finding? Because this provides a single basis, or "norm," for comparing the work of different observers, that is independent of range, instrument base length, and magnification. Why adopt "12 seconds of arc" as the unit graduation on the RCS scale? Because the stereo-acuity of our best observers will attain this figure and they should work within this limit.

The big question is "Are we getting the results we should expect?" Let's look at the records. The first year that antiaircraft gun batteries were *required* to use the stereoscopic height finder for target practice, the errors were widely spread from about 500 seconds of arc to about 20 seconds. In the case of the 500" error, inquiries indicate that the training of observers was entrusted to an acting corporal whose principal qualification was the ability to sense depth when looking into a height finder, and further, that no analysis of candidates' work, worthy of the name, was made until after the target practice was completed. In the case of the 20" error, the observer's training was personally supervised and intelligently handled by his battery commander. No opportunity was overlooked to provide the observer with experience of the proper kind. The results of three target practices, using the stereoscopic height finder for all practices, were good enough to win the Knox Trophy. Just how much training does an observer need? The most truthful answer is that his training is never-ending. However, there is an instance on record worth noting. A stereo observer, capably handled by an experienced instructor, furnished ranges on a moving target for a very creditable 155-mm. gun target practice, four days after he looked into a stereoscopic range finder for the first time. This same observer subsequently furnished altitudes for several antiaircraft gun target practices that were consistently nearer the actual altitudes than those furnished by the M1920 altimeter. This may be a bit unusual at the present time, but it should serve as a warning that altimeter operators need a considerable amount of training before their altitudes are reliable and also, these operators had better be well trained if you expect to use the altimeter to determine the errors of the stereoscopic height finder. One more instance illustrates what can be done with stereoscopic instruments. Very creditable results have been secured using stereoscopic observation of trial fire as a basis for applying adjustment correction. Well-trained observers experience little difficulty in reading the altitudes of shrapnel bursts.

The development of satisfactory methods of selecting and training stereoscopic observers has taken a long time. We still have a long way to go in applying the methods

which have been developed thus far. Similar remarks may be applied to the height finder itself. In 1925, when the decision was made to search for a satisfactory self-contained height finder, we were forced to go into foreign markets for stereoscopic instruments. As our experience in *using* stereoscopic instruments was negligible, so was the experience of our domestic manufacturers of optical instruments in *making* them. There were two commercial concerns equipped to make them, and accordingly each of them undertook the production of a stereoscopic height finder. In the meanwhile, we procured several stereo instruments of foreign make, such as Zeiss, Levallois, Schneider, and proceeded with tests. It was several years before our domestic manufacturers could present a stereoscopic height finder sufficiently accurate in performance to warrant consideration. They had a long hard row to hoe in developing the technique of making a good stereoscopic instrument. Their early experiences were very disappointing and quite costly. Apparently, in the beginning, few people realized what close tolerances were necessary in the manufacture and assembly of such instruments. However, most of the problems have now been solved and at present we may feel assured that there is no finer stereoscopic height finder in the world than the one with which we are being supplied. It is manufactured and assembled with the utmost care and precision, and yet it is sufficiently rugged to withstand a considerable amount of rough handling in field service. It is designed for ease of maintenance and repair. Almost any optical element may be removed without disturbing any other. The eye assembly is given particularly careful attention so as to minimize the possibility of eye strain. It is still rather bulky and heavy, but no more so than several other pieces of equipment in the antiaircraft gun battery. It is still rather expensive and will continue to be as long as we demand the accuracy that is now built into the machine. The rate of production is rather slow at present, but has reached the stage where it could be speeded up to meet our demands. There is a comparatively limited market for stereoscopic height finders, and no manufacturer wants to gear his plant to a high rate of production for a small market.

All of which winds up the principal business of the day. What remains? Nothing more than the customary end of every study.

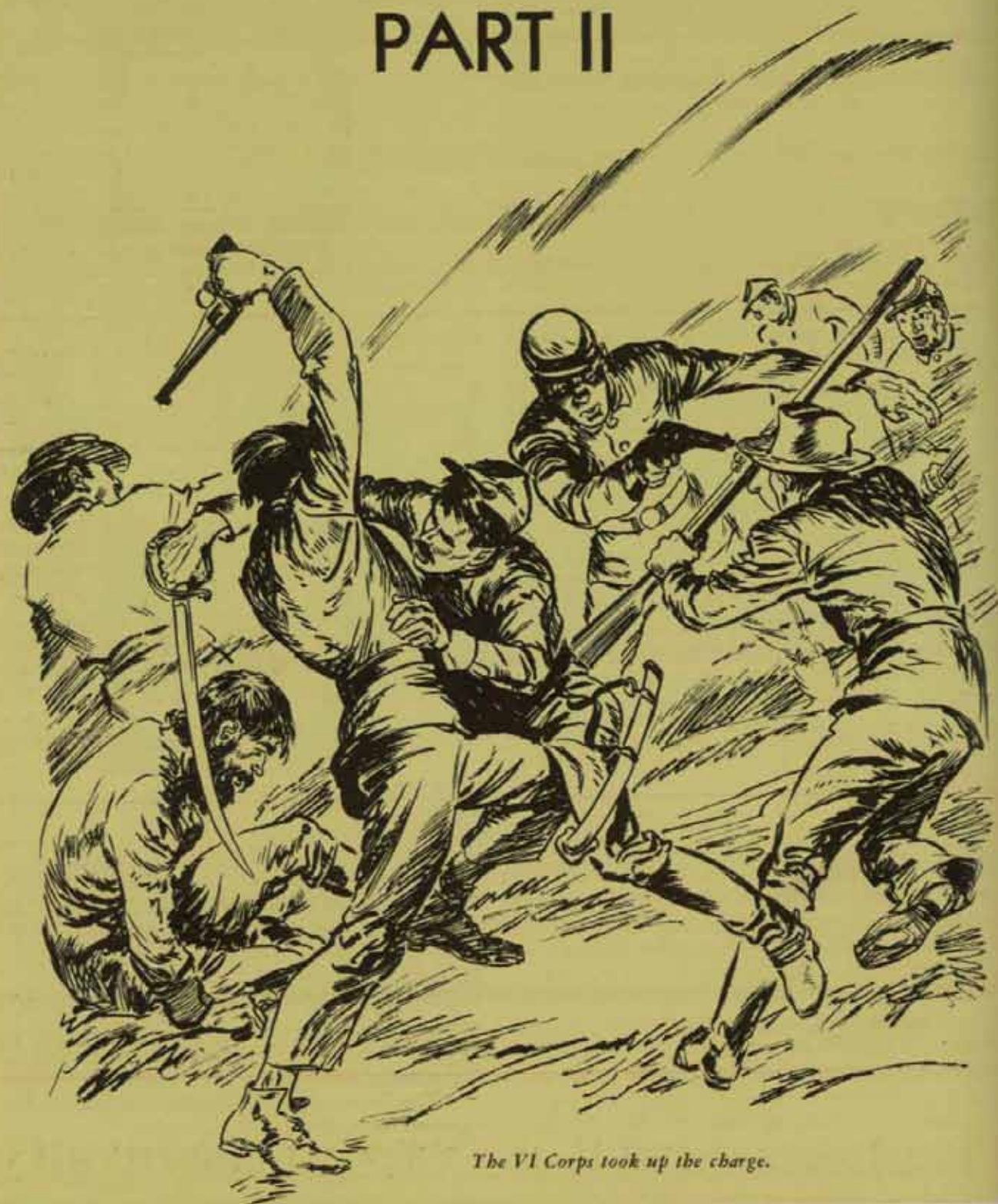
The opinions expressed and conclusions drawn are those of the author, and with this benediction pronounced, we proceed to conclude that:

1. There is no mystery about a stereoscopic height finder.
2. The supply of excellent stereo observers is greatly in excess of the demand for them. The ability is present in every human being with normal vision. Only experience is needed to develop it.
3. The Stereoscopic Height Finder, M1, is the finest instrument of its kind in the world today.

In brief, the stereoscopic height finder is here to stay, and the training of expert observers is no longer a problem. Let's make the most of it.

Little Phil

PART II



The VI Corps took up the charge.

When the word came Sheridan had moved a little up the Valley to Berryville. Early was camped west of him, before Winchester in a position where several roads came to a nexus among some jutting heights. Stonewall Jackson had won a battle there in '62; perhaps the Confederate commander felt it a place of happy augury to his side. Sheridan, who had visited the town during the early days of his Valley command, thought it radically defective as a military post, refused to put his own army there, and now planned to crush Early in it. At one o'clock in the morning of September 19, the men were roused from their beds, given a meal and hot coffee; at two, the whole army marched. Early had been moving his forces restlessly about during the previous days. Sheridan hoped to strike Winchester while only two of Early's four divisions were there, but planned to inflict a

Leuthen on whatever he did find. The main road from Berryville to Winchester, a good metalled highway, runs for three miles through a narrow ravine, then crosses a little belt of plain country and mounts a low plateau, at the far side of which stands Winchester town, with the abutments of Little North Mountain soaring up behind it. A series of tracks, passable for infantry but not much else, roughly parallels the road through the hills south of the ravine. There are more hills, broken and knob-like, north of it, reaching to the very foot of the plateau before Winchester.

The rebels had a fort at the outlet of the ravine, and their camps lined the plateau behind it, which was not quite high enough to afford a good view over the hills, nor did they have any force out in those hills.

Sheridan's orders put Wilson's cavalry division at the head of the advance. This officer was to use his mobility to the full; as soon as he found himself within the walls of the three-mile ravine press on at the gallop to seize the outlet fort, the only real danger to the movement. Behind Wilson, Wright's VI Corps was to march through the ravine to the edge of the plateau, attack and fix the Confederates there, while Wilson covered their left flank, filing off into some flat country southeast of the town. (See Map 1.)

The XIX Corps would follow the VI through the ravine, swing right around the foot of the plateau and deliver an oblique attack on the left wing of the rebels as they faced Wright. Meanwhile the VIII Corps would take the mountain tracks south of the ravine, strike in between

Wright and Wilson on the right wing of the Confederates. Torbert with the division of Averell, which was already north of Winchester, and that of Merritt, which left during the night to join Averell, was to come down the main Valley Pike on the Confederate left rear into the town. It was a combination attack, but one that stood in no debt to time, which makes combinations fail; for Sheridan's main body would be always under his hand for a change of assignments. In fact, all accidents were provided against but the one

that occurred after Wilson went galloping up the ravine with the first false dawn behind him, and dismounting his men, stormed the fort. General Wright, that capable but formal soldier, marched on behind Wilson to deliver a surprise attack with his full equipment of ambulances, wagons and baggage following the infantry. With break-downs and bunch-

ings this transport jammed the road through the ravine; the XIX Corps could neither pass nor speed up (Map 2). It was already noon and the VI engaging the whole rebel army in a fire-fight of the most murderous character when Sheridan in person discovered what was wrong, ordered the teamsters to "get those damned wagons into the ditch" and brought the XIX Corps to the field.

Now it was too late for them to oblique onto the Confederate left. Early had every man up; as the XIX Corps began to reach the field, he flung forward a storming column under his best officer, Rodes, against the right of the VI. One of Wright's brigades went; the attack rushed on till it was halted by a battery of heroes from Maine, who stayed to shoot things out—unsupported artillery against foot. They gained time enough for the XIX to reach the line, marching and firing across the rebel front, both sides suffering heavily in that open ground where there had been no time to take cover—suffering so much that by one o'clock the battle had sunk to a lull along parallel lines.

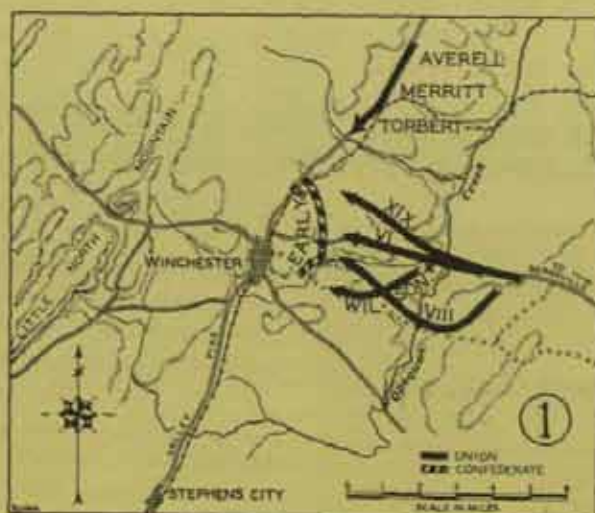
But one o'clock brought Crook and his VIII Corps. Boldly changing plans in the middle of action, Sheridan switched it across the rear of his front around the foot of the plateau to the right of the XIX, through the hills. Crook got his artillery onto a commanding eminence from which it would enfilade the rebel line. At three he delivered the attack meant for Emory under cover of the sudden, surprise fire from these guns. Among the Confederates Gordon's division was broken and driven in, the

By Fletcher Pratt

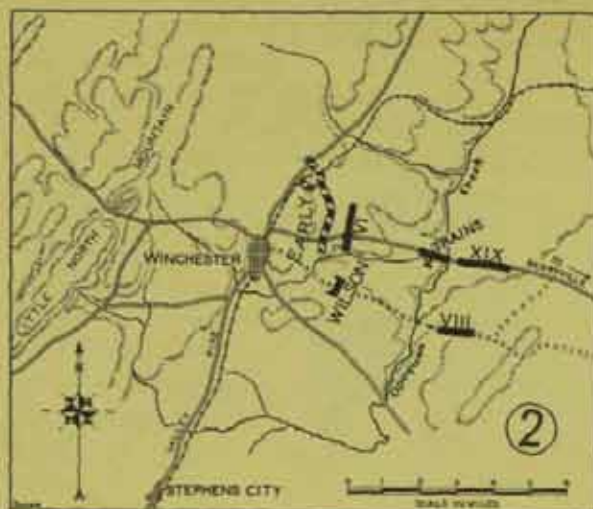
Illustrated by

HOWARD WILLIAMSON

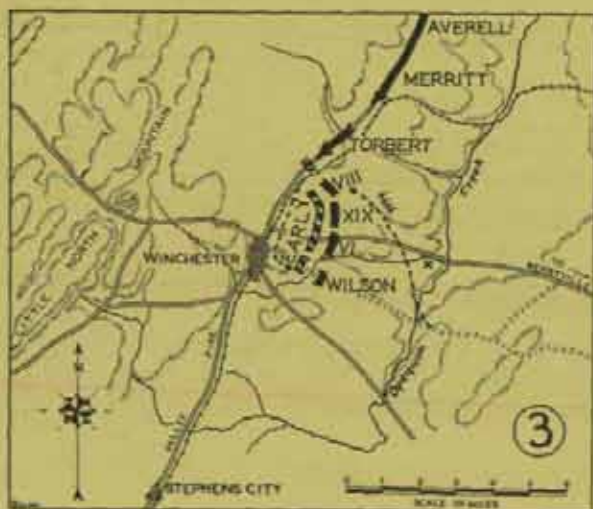
He ended the day of Napoleonic cavalry



Map 1: Winchester. Sheridan's attack plan.



Map 2: Winchester. The plan miscarries.



Map 3: Winchester. Situation at 4:30 p.m.

XIX and VI Corps took up the forward movement and it was only some distance back that Early managed to re-establish a right-angled line at 4:30. (Map 3.)

And now he found himself in still deeper trouble. Young Wilson had gotten his cavalry division into the saddle again after Wright took over the fort from him in the morning. All day now he had been circling through open ground south of Winchester, great masses of horsemen in full view but beyond gun-range of Early's men, reaching for their strategic flank, his action the perfect pattern for that of a motorized division. In the fog of war where decisions must be based on a glance, Early assumed that this was the whole Union cavalry force. He switched his own cavalry to fend it off, had nothing left to cover the left flank that was floating in air on the Valley turnpike when just at 4:30 Torbert came riding in at the head of five thousand horsemen.

As they appeared the Union men set up a whoop. Crook charged, Emory charged, Wright charged, the Confederate line was carried right away. "It was sad, humiliating, disgusting; I never saw our men in such panic before," wrote a Confederate officer who was in the wild rout that went tumbling through Winchester in the fading light. "God bless you," telegraphed Lincoln to Sheridan; for a moment all the voices of politics were stilled as this morning star of victory rose in the North, the brighter because it shone on the Valley, Stonewall Jackson's Valley, the rebels' great road of war.

That night Sheridan sent his tired, happy men to early rest. Next morning he had them on the roads with day. At Strasburg, where the Massanutten chain juts forth to split the Valley into twin tunnels, Early had taken his stand. The eastern half of this double Valley has bad roads and few from here south. Against an army it is necessary only to watch the other gap, and right across this behind Strasburg cuts a deep gorge whose rocky sides are ill work for even an unarmed man to climb, its western beginning being back among the folds of Little North Mountain. Early held a promontory on the far side of this gorge, called Fisher's Hill, and thought the position so strong that he sent his gun limbers to the rear.

On the night of September 20th Sheridan was already in Strasburg and had formed his plan of attack. As the Union troops filed in that evening the VI and XIX Corps were brought up with much parade and skirmishing to take position facing Fisher's Hill across the gorge. The VIII Corps, last in line on the roads, by Sheridan's order delayed its arrival, then came by a long circuit, concealed behind hills from the Confederate signal stations on the Massanutten. Crook did not join the other corps, but made for the slopes of Little North Mountain. (Map 4.) It is all forest there; the VIII Corps men kept well back among the trees, scrambling all day of the 21st and 22nd among the slopes and around peaks till they reached a position, still in woods, behind the Confederate left rear. Even their weapons were wrapped in rags to hide the gleam and clang.

Along the side of Little North Mountain, past the front

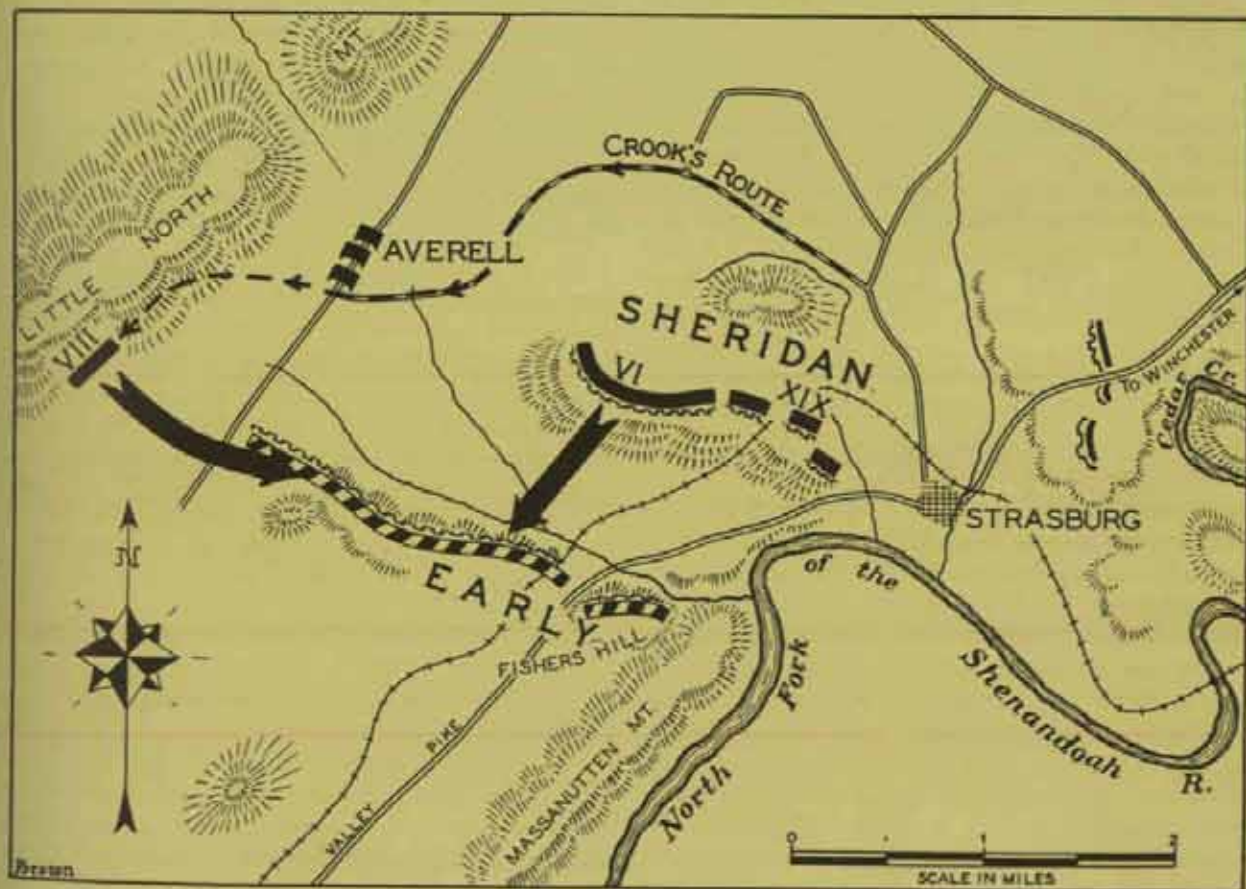
where Crook's men lay concealed, runs a narrow road. Well back on it Averell's cavalry division was massed to draw the Confederate left as far forward as possible, and to ride in behind Crook after he had delivered his blow. Torbert meanwhile, with the divisions of Merritt and Wilson, was hurried forward up the road of the eastern Valley through Luray, a forty-mile march which only cavalry could make at speed. He was to get across the Massanutten where they flattened at their lower end, seize New Market in Early's rear, intrench it and hold there. This march was the reason for delaying the main attack; Sheridan meant to make a clean sweep.

By evening of the 22nd September the cavalry had been given three days for its forty miles. The day had been spent in inconclusive skirmishing and artillery discharges around Fisher's Hill. The rebels were gathering round their campfires for supper in very good heart when the sun went down. It was the signal; through the long shadows that stalked across the valley, eleven thousand men of Crook's command dropped from heaven on the rear of the Confederate line. A shout went up, "We are flanked!" They broke, then began to run. The VI Corps took up the charge, scrambling across the wall-like ravine, with Sheridan in the middle of them, shouting "Forward everything! Don't stop! Go on!" whenever anyone asked him for instructions. Everything went forward; in the brief space between sundown and dark Early was driven

in rout with the loss of part of his artillery and a big haul of prisoners.

The verdict of Winchester was confirmed. The North went wild with delight, and hundred-gun salutes were fired from every military post, but to Sheridan it was his most unsatisfactory battle. He had planned for destruction; he got only victory. Down the Luray Valley Torbert had encountered an insignificant Confederate force in an intrenched position. He was a good officer, but in the old style; though he had seen it at the Wilderness, the new tactic of cavalry charging on foot meant nothing to him. He kept his men in the saddle, uselessly jiggling around, till the opportunity passed. At Fisher's Hill itself Averell committed an even worse fault. He waited respectfully for the infantry to clear the road ahead of him, and when they had not entirely done so by dark he went into camp. Sheridan instantly relieved him and gave the division to Custer.

Early meanwhile, was given no chance to rally. The infantry pursuit held so hot to his heels he was driven to the limits of the Valley. Washington, supported by Grant, wanted Sheridan to follow on and make a campaign against the rear of Richmond, but the latter turned this idea down—it meant long communication lines without any railroad support. Through the next three weeks, therefore, he moved slowly back north, burning out the ripe grain, driving off animals, and answering all protests by



Map 4: Fisher's Hill.

the bland statement that loyal citizens could bring claims against the Federal government.

II

His operations had caused as much consternation in the Confederacy as delight in the North. It was impossible to repair the physical damage the Army of the Shenandoah had caused, but for the moment this was less important than the question of morale to Lee and the Confederate high command. Desertions were rising at an alarming rate; the men needed the stimulus of a spectacular victory, preferably one that would severely punish Sheridan, since his was the only one of the Union armies that had gained clean-cut wins in offensive battle. Moreover, his work in the Valley was done; the Confederacy was not ignorant of the reports that the bulk of his forces would be returned to Petersburg.

It was thus that Lee came to detach Longstreet's corps to Early for one more drive down the Valley, the last and greatest. They made a long, fast march. At 3:30 in the morning of October 19 they were on high hills from which they could look down into the sleeping Union camps along the line of Cedar Creek, just north of Strasburg. At four o'clock a clinging mist hid everything a hundred yards away; at five the rebel yell went up and an attack from three directions at once struck the horseshoe circuit of Union camps. (Map 5.)

We may be sure that if Sheridan himself had been in those camps, with his uncanny gift for discovering an enemy's purpose and movements, there would have been no surprise. But Sheridan was not there; he was in Winchester (not twenty, but fourteen miles back) holding a conference with some bigwigs from Washington. The first division of the VIII Corps, caught in their beds, was swept away, partly taken, partly driven in flight, all its guns captured, without firing a shot. What was left of the corps tried to form line on the XIX, but was taken simultaneously in front and from both flanks and likewise driven into rout with hardly any resistance. The XIX, taken in reverse by infantry, cannonaded in front by the captured guns of the VIII, lasted less than an hour before dissolving, all but part of one division, which fell in with the VI and some of the cavalry and made a stand on a hill overlooking the road, well back.

It was a hasty assemblage, ill-organized, only the cavalry thoroughly sound, which had camped so far from the foot as to be outside the circle of the rebel attack. Early might have swept it away, but his tired, hungry men could not be torn from the luxurious plunder of the Union camps. At nine in the morning, he got enough of them together to form line of battle and attack Wright, who retreated slowly, in pretty good order, swinging out Torbert on his left in a movement that held so much menace that Early gave up the notion of driving home for the time being.

At eleven the Confederate leader had his men in hand and could try again. He came on all along the line, orders had been given for the Union force, the small surviving

Union force to fall back once more, when the discouraged and beaten soldiers heard, far in their rear, that unbelievable and intoxicating music—the cheers of Cedar Creek.

As they stared at each other in amazement the distant murmur swelled and swelled to a roar. In a few moments more men wearing the Maltese cross of the XIX Corps and the star of the VIII were joining them, not in order, but falling in under any standards or officers they could find. With them came Sheridan. He had mounted his horse at the shock of distant guns early in the morning, riding toward the sound until he met the first group of fugitives, whom he turned into a provost's guard by forming them across the road. "Turn around boys, we're going back," said he. The provost's guard grew to the strength of a company, a regiment, a division, a corps, shouting "Here's Phil Sheridan; we're going back!" and according to one witness, "throwing up their caps, leaping and dancing in wildest glee" as they hurried back to the battle.

"Where's the VI Corps?" asked Sheridan as he approached the front. There was nothing wrong with that formation; Wright had just stopped Early's last push, was all in line with Custer champing at the bit on one flank, asking every five minutes for permission to go, the other two cavalry divisions on his left along the road, and such guns as had been saved with them. Early, upset by this bold countenance on the part of an army that ought to be in flight, and still more upset by the presence of so much cavalry—his own was weak and had fought badly—was beginning to think of defense. He formed a new line, along walls and rail breastworks, carrying it out left and right to bring infantry opposite those menacing clouds of horse.

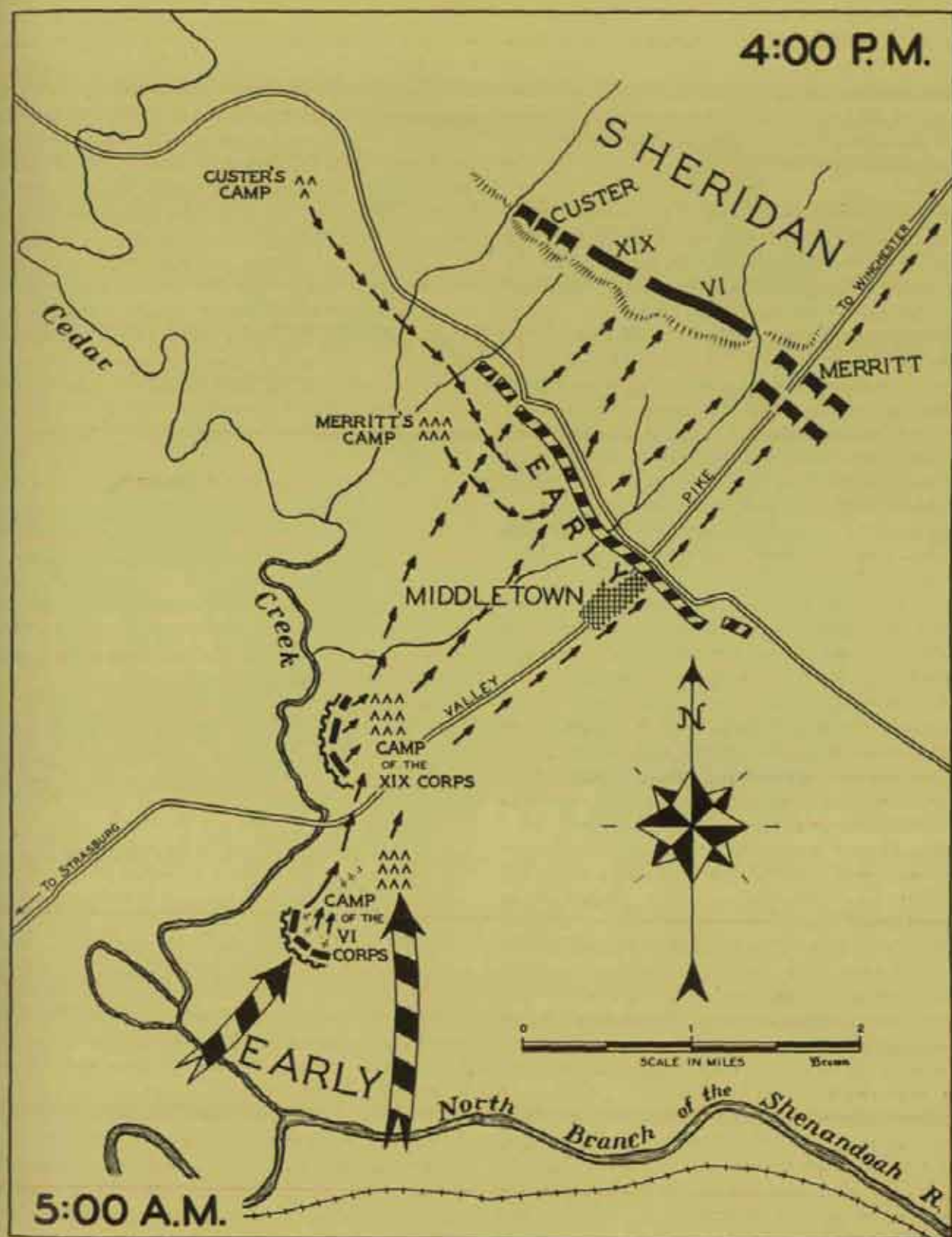
While he was doing it Sheridan rode the front of the Union formations from one flank to the other, swinging his old blue campaign cap and shouting, "We're all right. We'll whip them yet."

It would be near four o'clock when he reached the extreme right of the line and there noticed how thin the successive prolongations had made Early's line. There had been time now to get the returned fugitives into some semblance of organization; Sheridan swung them forward in a general attack. It is inaccurate to say that it broke through anywhere; the whole Confederate line rolled right away before that attack, with Sheridan everywhere, urging his men to, "Run! Go after them!"

"We can't run, we're all tuckered out," cried a private at him and drew the reply:

"If you can't run, then shoot and holler. We've got the goddamndest twist on them you ever saw."

They kept them going. The overpowering Union cavalry smothered Early's attempts to rally. They recaptured the Union guns that had been taken in the morning; they captured all Early's artillery; all his ambulances; his ammunition wagons, his transport of every kind, and 1,500 prisoners to balance the 1,400 they themselves had lost in the morning. Early went flying up the Valley in such shape that his corps had to be completely reorganized be-



Map 5: Cedar Creek.

fore it could take its place in Lee's lines, and the Shenandoah was out of the war.

The news arrived north with that of the capture of Atlanta. "Sheridan and Sherman have knocked the bottom out of the Copperheads," remarked Horace Greeley—correctly. For Democratic candidate McClellan was forced to repudiate his party's platform declaring the war a failure and the elections went Lincoln by so huge a majority as to constitute *carte blanche* to the President.

III

Latrine rumor had set the date of the opening of the 1865 campaign for March 29. The day broke cold, wet and cheerless over the Cavalry Corps, Army of the Potomac, which had done little but outpost duty since Sheridan left last fall. Gregg, whom the men adored, had resigned; Wilson had gone to the West; they did not know the new leaders—and it seemed that the war of siege and thickets in which they were now tangled would never end. But that morning a bugle blew sourly through the damp; they saw a guidon half lift and behind it there came riding down the line a skinny little man on a big black horse. Little Phil was back; the men cheered and passed the word that things would be humming now.

They were right. For days now Little Phil had been pacing the floor at headquarters conferences, replying to every argument with, "I tell you I'm ready now to strike out and smash them up. Let me go!" He had permission for that date. Before noon the whole corps, now 13,000 strong, was moving through the wet spring woods in the walking columns that meant a long pull with a hard fight at the end of it.

Nominally, it was to be a cavalry slash at Confederate communications—Sheridan's orders were effectively to break the two railroads that fed Lee—but actually the assignment was different, reflecting a subtle change in the status of both corps and commander. In the corps it was marked by the fact that only one of the three division leaders was now of the cavalry service—Custer, who had been brought up under Buford, and to the front under Sheridan himself. The others were led by a pair of infantrymen—Devin, Crook. And still more marked was the fact that now the whole corps was armed with repeating rifles and accompanied by that lavish equipment of artillery Sheridan had asked the year before—more artillery in proportion than the infantry itself had.

Obviously, this signified the triumph of Sheridan's theory of cavalry over Meade's. But this is not all. As a subordinate leader whose ideas had gained preference over those of his nominal chief, his position was somewhat anomalous. This anomaly was reflected both in his title, which was "Commander in Chief of the Army of the Shenandoah, serving with the Army of the Potomac," and his assignment in this opening campaign.

For the drive he headed was only nominally against the rebel railroads. As Grant instructed Sheridan before the move began, the true purpose was to make Lee come out of his trenches and fight. If, after Sheridan had

reached the railroad lines, the Confederates threw against him more forces than he could handle, good—he could use his mobility to dodge them and either swing back to the main army, or turn south and hook up with Sherman, who was now thundering through the Carolinas. Meanwhile Grant would take Richmond; for the detachment of a force big enough to handle Sheridan would leave Lee's lines unable to resist assault. If Lee divined the presence of the cavalry corps and opposed it with strong forces before it reached the railroads, good again—Sheridan was to call to his aid whatever infantry corps he found nearest, assume command of it, and fight the big battle right there, under his own direction.

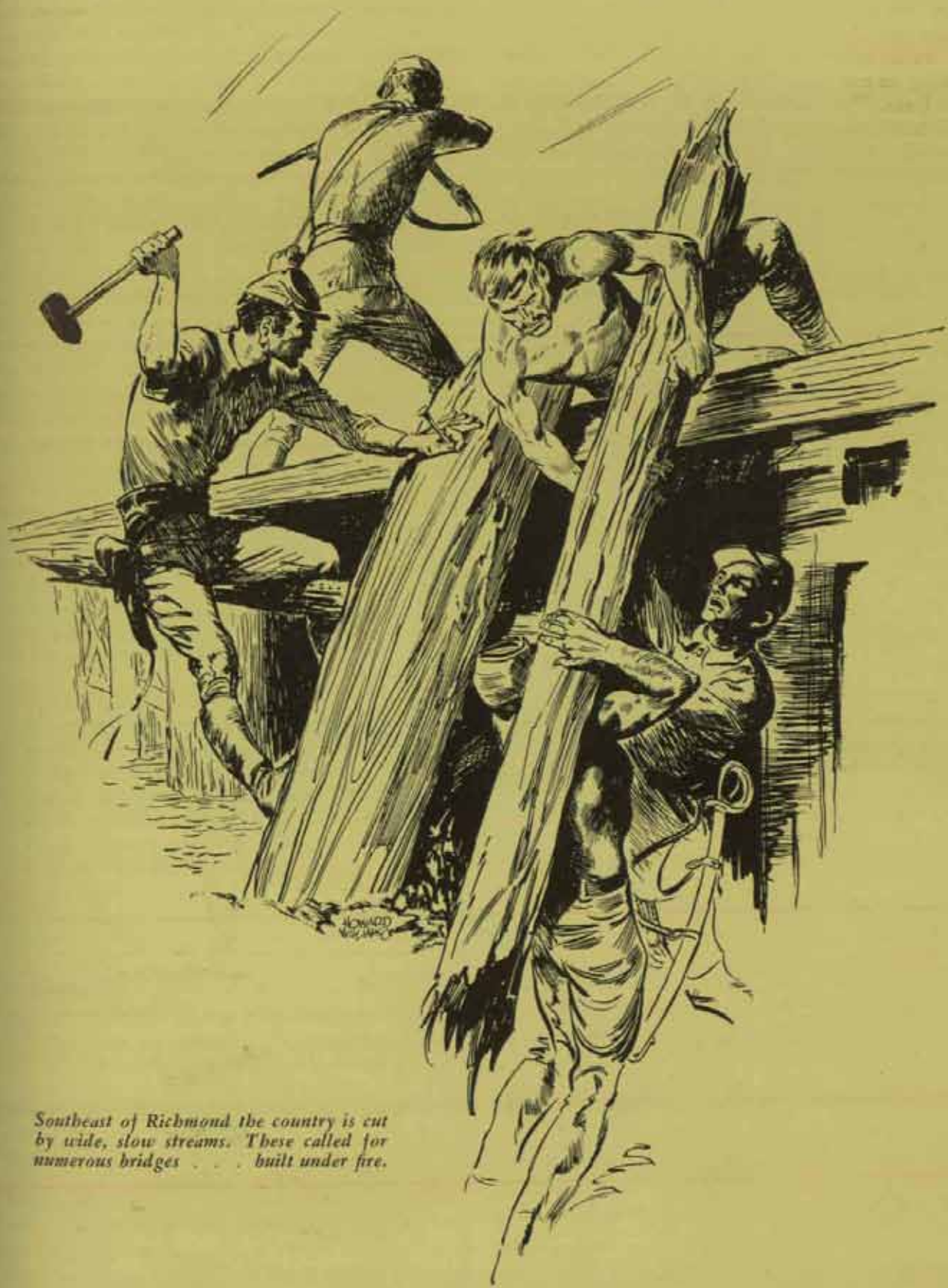
That there would always be one or more infantry corps near enough to help Sheridan was provided by the remainder of the army orders for the movement. Sheridan's corps was to cross the north-south Hatcher's Run, headed west, then swing north in a vast half-right wheel. Inside his movement, making the same wheel through a narrow circle, Warren's V Corps was to march; and inside Warren, through a circle still narrower, Humphreys with the II Corps.

In effect, then, Sheridan was given a semi-independent command as leader of a vanguard, with as many troops as he needed under his orders. In effect also, the last distinction between cavalry and infantry was abolished except during the period of the approach march. Sheridan's own corps was merely placed at the extreme wing of the turning movement because, of all the corps, it had the greatest strategic mobility, and of all the generals, he had the greatest skill at using speed.

On the afternoon of the 29th March it rained pitchforks and nigger babies, continuing through the night and the next day. The country southwest of Richmond is low-lying, densely wooded, quaggy, cut by wide, slow streams that give poor drainage. Under the pounding rains roads became impassable to wheels unless corduroyed, an important element in the military situation. It enabled the Confederates to gain utmost advantage from their South Side Railroad, running laterally behind the front of operations, and unaffected by the weather.

On the 27th, Lee had already learned of the cavalry concentration behind the extreme Union left, and realizing that it portended a raid around his army—though, it seems, he did not grasp the ultimate purpose of the movement—he planned to use his superiority in communications to drive a wedge between Sheridan and the main Federal army, smashing the former.

The night of the 29th therefore saw General Fitz Lee arrive at Five Forks with all the cavalry of the rebel army. Next morning he was joined there by Pickett, who was to have charge of the operation, and who had brought two infantry divisions with their guns down the railroad. At the same time the Confederate forces in the trenches executed a general slide rightward along their lines, setting free part of A. P. Hill's Corps and all of Anderson's for a surprise attack. This blow was to strike in on the extreme left flank of the Union infantry, where their



Southeast of Richmond the country is cut by wide, slow streams. These called for numerous bridges . . . built under fire.

trenches ended near the junction of the White Oak Road and Boynton road, rolling their line up eastward and away from Sheridan.

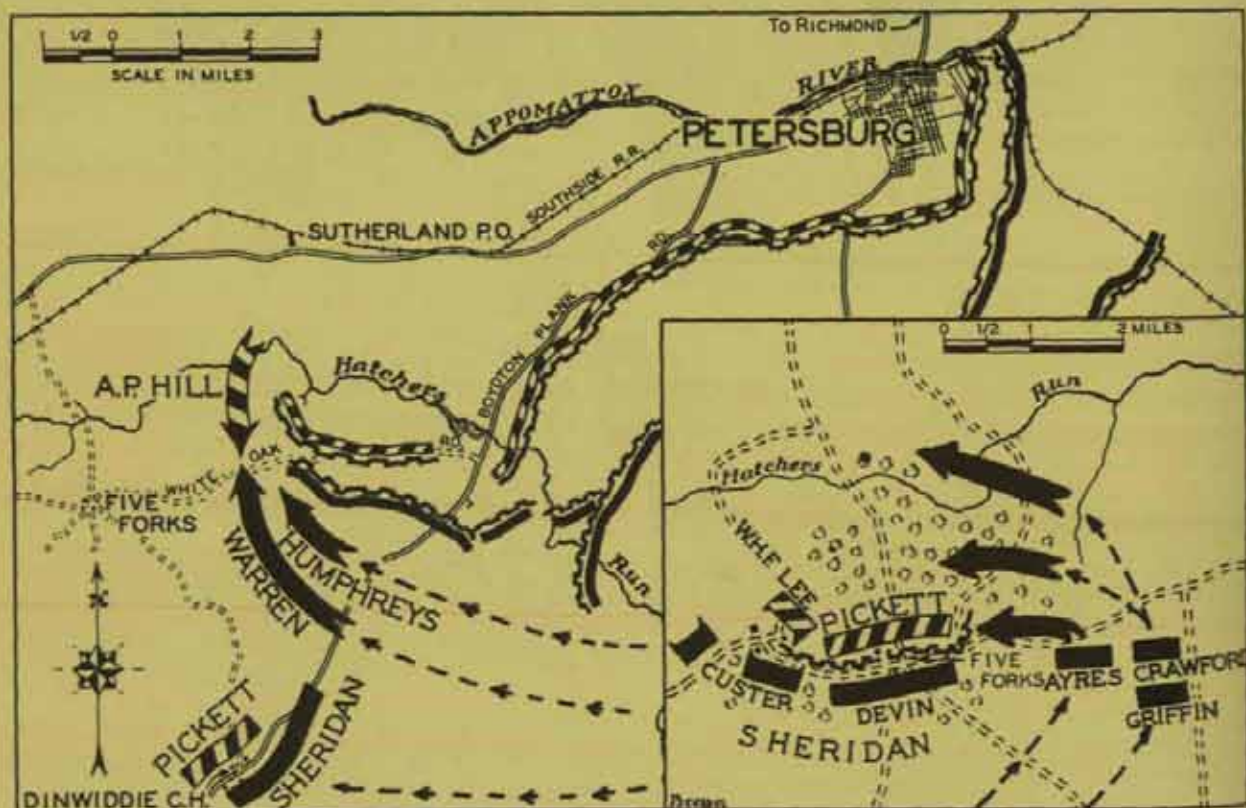
The 30th March was a day of obscure skirmishings in the woods under the rains. Sheridan's division Devin making contact with Pickett's cavalry vanguard near Five Forks. That same rain and the configuration of the roads delayed the march of Warren's V Corps and forced it in toward Humphreys of the II Corps, at the same time keeping Warren to a narrow front. When A. P. Hill's attack developed on the morning of the 31st it therefore struck the head of a deep column instead of the flank of a line. (Map 6.) Warren's leading division was indeed driven in, but the defense impacted along the line of a stream. At noon Hill was stopped; in the afternoon help from Humphreys joined Warren and he counterattacked so vigorously that by afternoon Hill had lost more than his gains and was clinging for dear life to his field works, so lamed as to be unable to take more than a defensive part thenceforth.

Southwest of this battle Pickett had caught Sheridan's columns coming along the several roads into which they had been forced by the rains. With artillery and concentration on his side (Sheridan's guns had been delayed when he pushed on with the horse), he drove the Union cavalry back to Dinwiddie Court House. But here, about the time Warren finished his job on A. P. Hill, Sheridan got all his men assembled in trenches and Pickett also was brought to a standstill.

At this point Sheridan's mission was already a success. Off to the east Grant was asking Wright and Patke whether they thought Lee had not taken enough men from his lines to make the final assault of Petersburg possible and they were answering "Yes." But Sheridan was not thinking in terms of the general success alone. He was filled with the spirit of the offensive, when he learned at five o'clock of Warren's success against Hill, he instantly perceived an opportunity to destroy Pickett. His own position, facing a little west of north, meant that the rebels facing him were nearly east-west, with Warren's Corps far in behind their left rear, already across the direct communications between Pickett and Hill. Warren had dealt Hill so rude a stroke as to eliminate him for the time being; he was therefore free. If now, during the night, he swooped on Pickett's rear with his three divisions—

Sheridan asked for the move. Far in the rear Grant and Meade, reports and maps in hand, discovered the same opportunity and sent Warren orders for the same move. But Warren, always a perfectionist, only replied by telegrams suggesting different routes of march, suggesting that a bridge be built, suggesting a dozen minor improvements in the plan, and while he wrote carefully worded dispatches the night passed. Pickett's scouts brought him word of the danger he was in. At daybreak he drew in his horns, and Sheridan was in no good mood over the missed opportunity as he followed up the retreat.

But now, on the morning of April 1, the weather con-



Map 6: Five Forks.



Half of Anderson's command was taken prisoner.

ditions that had fought for the Confederates shifted their allegiance. Pickett's men had come with trains and guns; even were these sacrificed they could hardly get away from Sheridan's lighter-moving cavalry along the foundered roads. Pickett had to stand for a fight. He chose a position at Five Forks, where some old trenches, hastily improved, gave him some chances. His front was a rough crescent covering the road junction, facing south and with the left flank covered by a switch. (Inset, Map 6.)

Sheridan, as usual in possession of complete, accurate information about the enemy, had been following close with his 13,000. His orders brought Warren on the scene from the right and at one o'clock the position solidified. Custer was facing the right flank of Pickett's trench-line. Devin was spread along its front. Both were dismounted,

along the edge of woods, with instructions to offer constant threats of attack, with the exception of one brigade of Custer's command, which was kept in the saddle working westward, as though to attempt something against Pickett's right wing, and thus attracting Fitz Lee's cavalry to the defense of that flank.

This left Pickett with only that reentrant angle of trench to cover his left, and against this Sheridan designed to put in the whole of Warren's Corps, supported on its right by the independent cavalry division of Mackenzie, which Grant had speeded forward. The attack was to be an oblique with a tremendously reinforced right wing, to throw the Confederates away from their main army. Of Warren's three divisions, that of Ayres, the weakest, was deployed to come against the Five Forks

lines from the southwest, linking up with Devin on its left and engaging the attention of the rebels at the angle. Crawford, the heaviest of the three divisions, would dress on Ayres, slide past the end of the refused angle of trench and cut around to take the line in reverse. Griffin, with the third division, was to follow Crawford in column, lending intolerable weight to his push, Mackenzie ride beyond Crawford and cut the rebel retreat.

But Warren drew his sketch-map for the operation wrongly, placing the limit of Pickett's trench-line too far east. The consequence was that Crawford, with Griffin following, missed it entirely. Ayres, with whom Sheridan himself was riding, suddenly received an intense fire of musketry from his left, where his troops caught the blast from the angle.

Sheridan himself rode to the skirmish line, helping Ayres half-wheel the division leftward, bringing up the reserve brigade to prolong the line out to the right. His staff rode off to keep Crawford and Griffin going on the line they had already taken, striking far around behind across the direction of the rebel retreat. Little Phil labored like a demon, got everything into position, carried two regiments out until they lapped round Pickett's trench line, and then personally led a whirlwind charge, riding his big black horse with a guidon in his hand. Pickett's flank burst; Devin swung in as the attack reached his front and the Confederate line was rolled up. Griffin and part of Crawford arrived from the woods to destroy the last rally; Pickett lost 4,500 prisoners, all his guns, most of his trains, and Lee's striking force, the only one he had for offensive operations, was destroyed.

And where was Warren while this was going on? He had been near Sheridan when Ayres was struck by the first flanking fire. When that broke out he rode off into the forest to change the direction of divisions Crawford and Griffin, but in the tangle of woods missed them too, and did not again reach the front till it was all over but the pursuit. There was one thing Little Phil Sheridan could never forgive in any man—unwillingness to get to the scene of action. Now Warren had twice in two days been missing when he was most wanted. Sheridan peremptorily removed the hero of Little Round Top and gave his corps to Griffin.

IV

Now the lion of the South was wounded to death, no more men left for any offensive blow and along the Petersburg lines Wright and Parke attacking him. They won a lodgment, a trench, a whole line of trenches, they were in, during that twilight when Pickett's last stand before Sheridan so disastrously broke. Next morning Jefferson Davis was summoned from church to flight; another morning and Weitzel's men of the XXV Corps were marching into Richmond under smoky pillars of destruction.

The pursuit started that April 3, Sheridan leading, with the cavalry and V Corps under his orders, Meade following fast with the II and VI Corps, and Grant bringing up the rest of the army. Lee's assembly point was

Amelia Court House. Both Grant and Sheridan guessed it would be near there. The moment the Petersburg lines were won Sheridan had been rushed forward to get across the Danville Railroad between Jetersville and Burke's Junction. He reached position on the 4th April, before Lee was fully assembled. That same night the V Corps was intrenched at Burke's Junction, (Map 7), and one of Crook's brigades lashed out along the line of the South Side railroad toward Farmville. It was this brigade that caught and burned Lee's headquarters train the next morning, where it had been sent on ahead of the flying army.

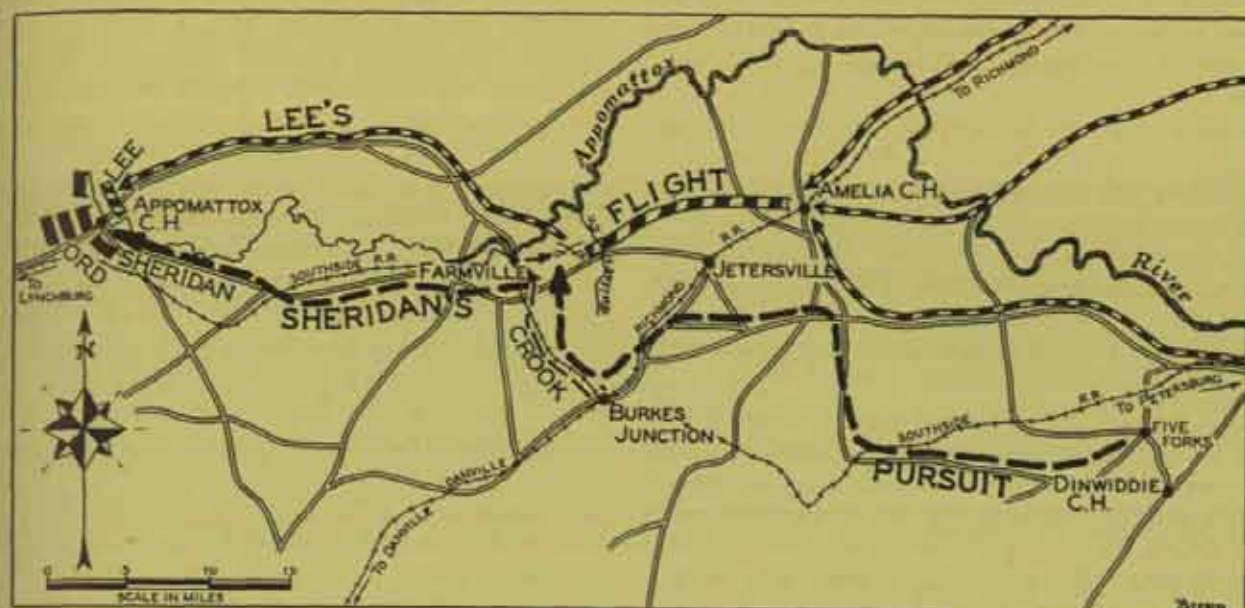
Meade did not arrive with the other two Union Corps till the 5th. Lee got his men fully in hand that day, and though the troops were dog-tired and starving, dared not stay with Sheridan's formidable force already seizing positions along the only line of retirement now left open. He marched by night, in several columns with the trains north of them, to their right—a change from his original plan, which had been to send the trains ahead, clearing the roads—a change forced by Sheridan.

In the morning Meade went toward Amelia Court House in attack formation and found Lee gone. But Humphreys of the II Corps caught the tail of one rebel column and his cannonading helped turn the whole army in the right direction. Besides, Sheridan, reaching far north on the extreme left wing of the Federal army, had already attained so great a distance that the Confederate columns had been unduly crowded toward their right, in on their own trains. This slowed them up badly. Crook's cavalry division was granted time to slip between two of the formations and attack trains so energetically that Anderson's Confederate Corps had to stop and form line of battle to drive Crook off, just west of Sailor's Creek.

This halt also stopped Ewell, who was behind Anderson on the roads; Wright's VI Corps caught up the latter and forced him to stand on the banks of Sailor's Creek. Meanwhile Sheridan brought the rest of his division up to help Crook hold Anderson's force. The latter was now in a line of hasty field works; Sheridan fronted it with all his corps but Crook, who was shifted round Anderson's front to close the only road of retreat. Ewell sent to Anderson, proposing they unite and drive this cavalry off, but before either general could do anything about it, Wright's artillery opened and at the same moment Crook led a dismounted charge onto Anderson's flank and rear.

Anderson was blown right away, with half his command taken prisoner, and the advance rushed on to surround Ewell, who surrendered with what was left of his corps before evening. The trains all went, too. But though Lee had lost nearly half the men he had on March 29, he had now gained a lead on the whole Union army with the rest.

However, there was still Sheridan; there was always Sheridan in this campaign, reaping the fruit he had planted at Yellow Tavern, when the Confederate cavalry service was struck down forever. As soon as the fighting round Sailor's Creek was over, he turned southwest, spend-



Map 7: Pursuit of Lee.

ing his mobility without stint to get round the Confederate column toward Lynchburg. Behind Sheridan the V Corps was moving west on the roads south of Appomattox River, and south of the V Corps, Ord with the XXV Corps, which had marched far and fast, taking no part in the move toward Amelia Court House.

On April 7, while Humphreys' II Corps was pecking at Lee's rear guard near Farmville and the Appomattox crossing, Sheridan was gaining, going right past Lee to the south. On April 8 in the morning he turned north to Appomattox Court House. There he caught Lee's trainloads of provisions, and the poor rebels went to hungry beds that night. Next morning Fitz Lee and Gordon were appointed to fray a passage through Sheridan. They tried; there were a few shots fired and some little movement but for once the greatest fighting leader of the Union did not fight. Sheridan's cavalry merely moved right and left like a parting curtain, and allowed the Confederates to see the solid lines of Ord, rank on rank.

"Then there is nothing left to do but go and see General Grant," said Lee.

V

After the war Grant, who had come to lean on Sheridan as his man of all work as he had leaned on Sherman in the west, remarked that Little Phil was the one man he could trust to lead an expedition without going off on a private war of his own. "I rank him with Napoleon, Frederick and the great commanders of history."

At the time there seems to have been general agreement, but since then Sheridan's fame has been somewhat obscured by that of Sherman and of Grant himself. Partly, this is no doubt due to what may be called the atmosphere of modern military thinking. The method of Grant and Sherman, strategic attack combined with caution in the tactical field, is apparently more in accord with modern

conditions of war than Sheridan's free offensive.

Sectional feeling also plays an appreciable if minor part in the relative decline of Sheridan's renown. In New England, where the best and most numerous studies of the Civil War have been written during the last generation, Sheridan has always been seven kinds of a scoundrel for removing the chivalrous Warren in the very hour of victory. Grant's own reason for his appreciation of Sheridan furnishes another partial clue—Little Phil did not go off on private wars. To anyone reading the orders he received with a record of subsequent events, his contribution is apt to appear purely executive. His full influence does not appear till one examines the part he played in having the orders written as well as the documents themselves.

Yet in the long run, it is Sheridan's very success that has deprived him of more complete appreciation. The eye of the beholder becomes irresistibly fixed on the spectacle of the mad scramble up Missionary Ridge, the ride from Winchester and the rally at Cedar Creek, the little man jumping his horse over the barricade at Five Forks. It makes him look like a leader of happy improvisations, of whom it could be said as of Logan, "Everything he did on the spur of the moment and in the heat of battle was sure to be right; everything he did on mature reflection was wrong."

This would not be too heavy an accusation, even if it were true. No nation and no army were ever in more need of such moral stimulus as brilliant improvisation can supply than the United States and its forces in the summer of 1864. No man was better fitted to supply that stimulus than Sheridan, who showed a gift of arousing enthusiasms paralleled in American history only by Jacob Brown.

But the accusation is not true. We should not let the

fact that none of Sheridan's great battles were fought out exactly as planned blind us to the other fact that he could plan a battle as well as fight one. Something nearly always happens to disturb battle plans—the obstinate refusal of the enemy to behave as expected, if nothing else. The rare thing about Sheridan, the quality that lifts him to several thousand feet altitude over the ordinary commander, was the ability to recognize in the midst of action that a change of plan was necessary. At Winchester, he planned to break down one flank; it became impossible, but he instantly and successfully broke down the opposite wing. At Five Forks the failure of his original plan only led him into another, far better.

It is this quality of flexibility of mind, of being able to do anything and everything, that makes Sheridan difficult to classify or even to appraise. He had no military specialty, like Thomas' counterattacks, or Stonewall Jackson's flank sweeps or Sherman's clutch-and-circle. He did whatever the occasion required. At Perryville he counter-attacked; he intrenched at Halltown, cautiously; at Missionary Ridge he was bold to the point of recklessness; worked a surprise attack at Boonville; ordered two gigantic flank sweeps at Fisher's Hill and a frontal assault at Winchester. The limits of his talent were never reached. Perhaps there were none.

Grant apparently thought so, and if his testimony be thought biased by association, one need only turn to the archives of the French Empire. There is a report there from Marshal MacMahon, a not-unqualified judge, dating from 1866, when Sheridan went to the Texas border with an army corps to help the French make up their minds to clear out of Mexico. "It might be worth making a fight" says this report in substance, "if Grant were their commander. But not against this man."

This is not the kind of opinion one expresses with regard to a mere improviser, and the more one studies Sheridan's career, the clearer it becomes that behind his improvisation there was steady, careful planning, based on intimate knowledge both of the enemy and geographical conditions. It is not the type of planning that

aims to eliminate chance, but to leave sufficient reserves of force to overcome chance.

Even Cedar Creek, the least planned of Sheridan's battles, the one in which he was planned against, corresponds to this rule. His camping arrangement placed the cavalry so far from the infantry during the night that the two camps could not be comprehended in the same attack. That cavalry formed the reserve in a sense, when he began the battle again in the afternoon. It won the fight, though the infantry did the physical work, handled the contacts. For it was the threat of the cavalry that prolonged and thinned Early's lines in preparation for the infantry action, as the threat of cavalry paralyzed Pickett in preparation for infantry attack at Five Forks, as the threat of cavalry halted Anderson and Ewell in preparation for infantry attack at Sailor's Creek.

In fact, it is this constant use of the mobile force as a threat that more than anything else characterizes Sheridan's technique and perhaps holds the key to the recovery of the lost offensive by armies of the future. Sheridan's cavalry as cavalry, mounted, charged into the thick of a fight just three times—at Boonville and Winchester (Torbert's), where the charges came altogether as surprises, and at Yellow Tavern, where the horsemen were operating against an enemy also in the saddle, who had lost momentum. In the rest of Sheridan's campaigns cavalry merely threatened to charge, and by this threat dislocated the enemy mentally and physically, induced him to alter his dispositions and prepared the way for the decisive advance of the infantry. This happened at Cedar Creek, Winchester, Five Forks, even in a sense at Fisher's Hill, where Early kept watching Averell. At Sailor's Creek alone was the threat made good—but then by cavalry metamorphosed into foot.

Yet when all is said and done these are details of something that one is not permitted to examine in detail. There are no details of Sheridan's career. It is one, and that one inimitable, from the day when he tried to spit a cadet sergeant on a bayonet to the day when he ramped victoriously across the fields of Appomattox. Between the two he had won the greatest moral victories of the Civil War.



Troop Schools in the Coast Artillery Corps

By Major Coburn L. Berry, Coast Artillery Corps

The Army post-graduate educational system of troop schools—various extension schools, special service schools, Leavenworth, and the War College—provides for the proper professional and technical education of all officers.

In general, the system is unexcelled. But the troop schools which should afford a means of broadening and extending an officer's education and of preparing him for the various service schools do not always accomplish their mission. Too often the troop school is considered just one of those things which must be done in order to comply with a training directive. Post authorities take a perfunctory attitude, so that interest of the students is quickly killed.

According to AR 350-5, troop schools exist to provide:

1. Tactical and technical instruction for warrant officers and enlisted men.
2. The basic course for commissioned officers.
3. General military educational courses for commissioned and warrant officers on duty with troops.

The first purpose of the troop schools is amply covered by gunners' instruction, and schools for specialists.

The second purpose of the troop schools—"to prepare newly appointed officers to perform the duties of their grade by providing for them instruction in the basic military subjects" is absolutely necessary if our juniors are to learn the elements of their profession. But some changes are necessary, for certain of the subjects taught are already a part of unit instruction, in connection with the normal training activities of an organization. The average battery commander is an extremely busy man, and he cannot be expected to personally conduct training in administration, saber manual, and elementary gunnery. To cope with this condition it has always been my custom to require newly appointed officers to keep a morning report, sick report, and duty roster. This, however, was under the supervision of the first sergeant, rather than under my direct charge.

If it is intended that the newly-appointed officer take this instruction in his stride, "as a part of the unit training," this is a rather haphazard, catch-as-catch-can method, and does not do him any good.

Above all, there is one thing that should be required of the newly appointed officer: he should qualify as an expert gunner with his battery's armament. This does not mean that he qualify merely as gun commander or a plotter, but that he qualify as expert gunner with every type of armament that his battery has. This entails, of course, first qualification as second class and first class gunner. This instruction is easily given as a part of normal unit training.

In this connection I recall that some years ago, a Coast Artillery colonel decided that too few officers had any knowledge of the elements of submarine mining. Accordingly, during the period that the planter paid its

annual visit for mine practice, all lieutenants of the harbor defense regiment at that post were attached to the mine battery for training. These officers reported in fatigue clothing and were given gunners' instruction in small groups, in the loading room, the casemate, and in the mine plotting room. After shore instruction was over, the officers were taken aboard the planter and given practical instruction in the duties of the planting detachment. They were also given training on the distribution box boat. Finally, they were allowed to act as mine field officers. As a result, a number of officers who previously had not had the opportunity to learn submarine mining became acquainted with the elements of this important and technical phase of Coast Artillery work.

The criticism may be offered that this method places officers under enlisted men for instruction, but the criticism is not valid. Any officer worth his salt is always willing to learn from any one who can teach him, regardless of rank or position. Furthermore, what is the usual course of a new battery commander when assigned to armament with which he is not familiar? He takes one of the gun commanders to the battery or gun park to teach him the individual peculiarities of the guns.

Now we come to the third purpose of the troop school; general military educational courses for commissioned and warrant officers on duty with troops.

Too often these schools are conducted without differentiation as to the degree of professional education of the students other than excusing from attendance graduates of the Command and General Staff School. Surely courses suitable for a lieutenant who has three years' service and has not attended the Coast Artillery School, are not what is required for a captain of ten years' service who is a graduate of the Coast Artillery School.

Another criticism of the troop schools is grounded in the lack of imagination shown by too many post authorities. This does not mean that the subject matter is not well chosen, but that the same course is repeated year after year without change. This results in an officer, in a normal tour of duty, taking the same subject at least twice and sometimes more.

Finally, the method of instruction too often is faulty. On many posts, troop school is held immediately after lunch, when a full stomach is more conducive of drowsiness than of attention. Moreover the "instruction" consists largely of reading pertinent Training Regulations or other publications to the students. Such instruction manifestly does not lead to original thought.

Criticism without suggested remedies is of no value. Let us see if we can apply a corrective to the situation.

The first remedy is to conduct not one, but several, troop schools, basing the curriculum on education and experience of the students. This calls for careful planning

before the school starts, not only by the post plans and training officer, but also by the higher command (corps area and Coast Artillery district) in the event that the superior authority has its own ideas on subject matter to be covered.

For the instruction of newly appointed officers (the basic course) the school can well be combined with that conducted for the Thomason Act officers. It is my understanding, based on conversations with Reserve officers who are at present on such duty, that their school is a combination of personal instruction and extension school. In other words, instruction is given by instructors in class but is based on detailed work sheets, including quizzes, prepared by the various chiefs of branches, and furnished to the posts concerned. But whether or not newly appointed officers are given instruction with Thomason Act officers, their training should be similar. In addition, it should be coordinated by the War Department, and based on detailed directives, work sheets, and quizzes, prepared by chiefs of branches, so as to insure uniformity of instruction throughout the service. We cannot afford to take the chance of spoiling good officer material by slipshod methods of instruction during the formative period of an officer's career.

The second phase of troop schools should be designed for the officer who has completed the basic course, but who has not yet attended the Coast Artillery School. This portion should be so arranged as to prepare him for that very important part of his post-graduate studies. The officer will get plenty of practical instruction in connection with his normal duties with his battery. We need, therefore, concern ourselves only with his theoretical instruction. For the theoretical instruction in gunnery, it is difficult to find anything better than the Extension Courses of the Coast Artillery School. These are 20-1, "Fire Control and Position Finding for Seacoast Artillery"; 20-26, "Basic Gunnery, Fire Control and Position Finding for Antiaircraft Artillery"; 30-5, "Gunnery for Seacoast Artillery"; and 30-6, "Applied Gunnery, Fire Control and Position Finding for Antiaircraft Artillery." Instead of having regular classroom sessions, require the student to complete the proper number of lessons in these subcourses, and in any case not less than one lesson a week. This calls for approximately three hours work per week. If he is ambitious or interested, he should not be limited in the number of lessons he may complete. It is absolutely essential, that he be given a certificate of completion of each subcourse, in order that he will not be required to repeat work already completed when he gets to another station. Proper records should be kept and transcripts forwarded to new stations on transfer, in order that the officer's new commanding officer may be informed as to his progress.

For those officers who have graduated from the Coast Artillery School, but who have not yet attended the Command and General Staff School, there are two possible solutions:

The first is to require them to enroll in the extension courses of the Command and General Staff School. In one

corps area this has been required of all officers in this category on the Detached List, unless they attend regularly a troop school at some nearby post.

The second solution, and to my mind, the better one, is for the regimental or harbor defense commander to assign each officer a problem to solve in connection with tactical or logistic problems which actually exist. For example, in the harbor defenses of Y, the searchlight installation may be unsatisfactory. Captain A, is given the problem of drawing up a searchlight project; for example, given fixed batteries as now installed, baselines and observing stations now in place, how many fixed searchlights do we need, and where should they be located? Are any of our present lights so located that they interfere with observers?

At other harbor defenses, one of the questions which must be solved and of which a study might well be made is the problem of supply of ammunition and other items during war. What transportation is needed, where will the distributing point be located, what routes will be followed, and how much manpower is required?

Problems of this nature have many advantages: they cause the student to study local problems, they cause him to make practical application on the ground of the theoretical studies made at the Coast Artillery School, and finally the harbor defense commander and the plans and training officer may get some fresh ideas.

If the problem is of enough importance, the same task may be assigned to several officers, but in no case should it be assigned to a committee. To get maximum value from the work, each student should be required to hand in an original solution. Experience shows that where a committee handles a problem, one or two officers do all the work: the other committeemen are carried by the workers.

It will be noted that with the exception of the basic school for newly appointed officers, no formal classroom work is required. The time limits on turning in problems calls for a minimum of work, but still provides for a maximum to be attained by the individual if he so desires. The caliber of solutions submitted gives an indication whether the student is doing honest work, or is just getting by. A student who does more than the minimum, has surely furnished his CO with an answer to the question on the efficiency report: "Has he taken advantage of the opportunities afforded him to improve his professional knowledge?"

In so far as general military education is concerned, several years ago the War Department published a list of suggested reading matter, divided into periods according to service and professional education of the readers. The importance attached to this outside reading is indicated by the fact that the list has been republished in installments, in the Command and General Staff School *Quarterly*. Just how many officers have read the books listed is unknown, but it is not believed that the number is large. This reading list might well be "required" not "suggested," each officer being required to certify to his com-

manding officer that he has read the books appropriate to the period of his service. The Navy goes a step farther than this—not only does it have a required list of reading matter, but it also requires book reports to be submitted.

If such reading is made compulsory, it will be necessary for post libraries to stock the books on this reading list. If these books must be purchased from library funds, it may take several years to build up such a collection, but if the reading list becomes a "must," the War Department would probably provide the books to all posts.

Then again, at some posts it may at times be possible to arrange for lectures on subjects of general interest by authorities in various fields. All officers should be required to attend these lectures.

There has been no mention of graduates of the Command and General Staff School. No one can quarrel with the fact that these graduates are usually excused from attendance at troop schools, but surely their abilities should be made use of in planning and supervising the troop school.

This discussion does not pretend to be a panacea for all the ills that afflict the troop schools. It is simply one man's ideas for their correction. An officer's education must be continuous and should be carried on concurrently with his daily work in addition to the periods of intensive instruction at the service schools. That the old adage "If a thing is worth doing, it is worth doing well" applies to troop schools as well as to other forms of endeavor.



THE CAISSONS ROLL

This unit of the Royal Artillery has arrived on the Western Front. Picture passed by French censor.

THE GERMAN CAMPAIGN IN POLAND



By *Lieutenant Colonel von Wedel* General Staff Corps, German Army

This article confines itself to an account of the military campaign in Poland during September, 1939. It must be left to history to pass judgment on the entire ramifications of these events.

On the basis of der Führer's directives the commanders in chief of the Army, Navy, and Air Force launched and conducted the campaign.

THE LAND OPERATIONS

In compliance with instructions issued by Colonel General von Brauchitsch, commander in chief of the Army, the operations of the German forces began at 4:45 A.M., September 1, 1939. Two groups of armies had been organized to carry out the operations:

- (1) The Group of Armies of the South, under the command of Colonel General von Rundstedt;
- (2) The Group of Armies of the North, under the command of Colonel General von Bock.

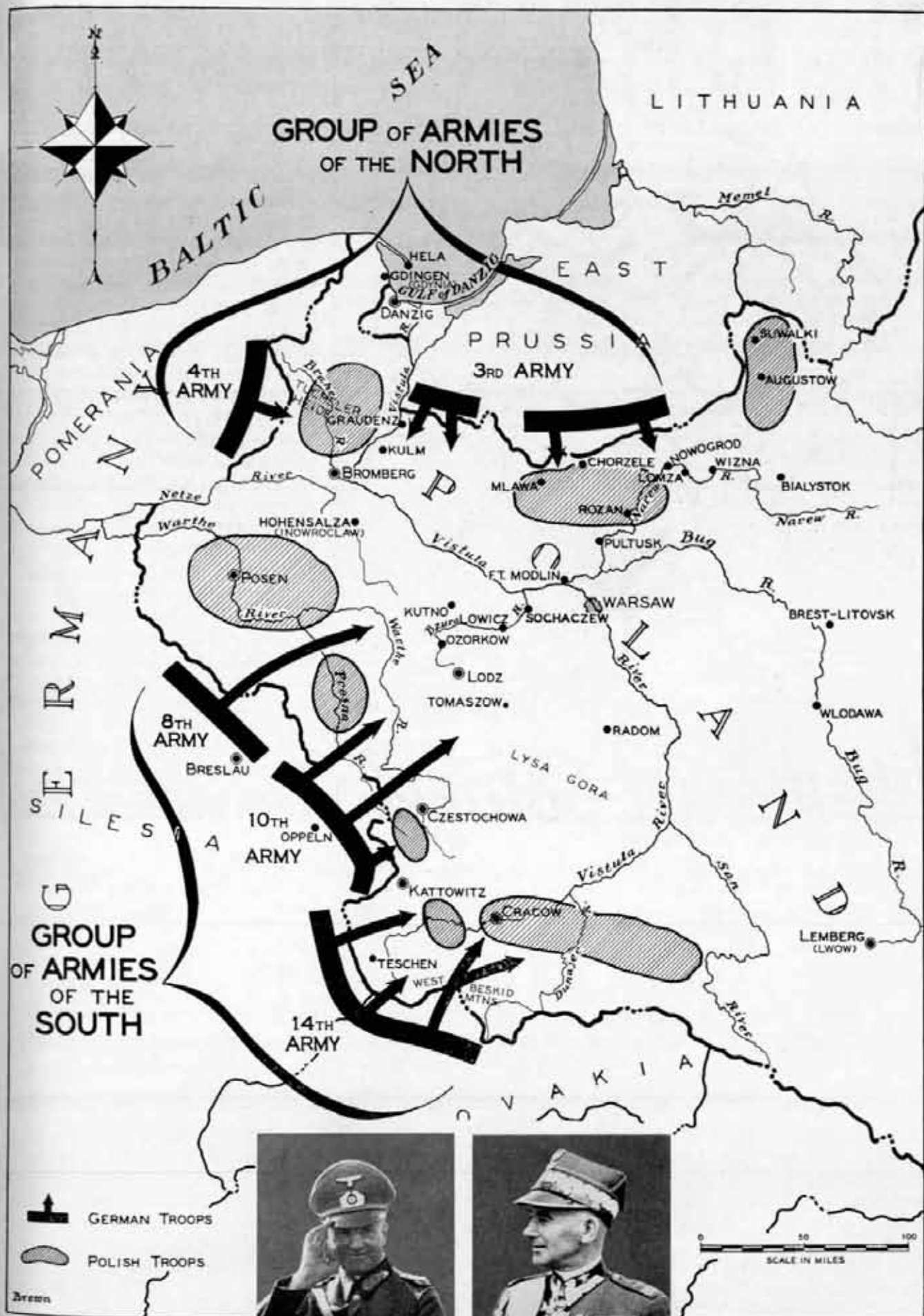
The southern army group comprised three armies: the

Fourteenth Army, commanded by Colonel General List; the Tenth, commanded by General von Reichenau; and the Eighth, commanded by General Blaskowitz.

The northern group included two armies: the Fourth, under General von Kluge; and the Third, with General von Küchler in command.

The operations in Poland were designed to destroy as much as possible of the Polish Army in the territory west of the Vistula. Furthermore, by advancing the exterior flanks in the north and south so that they would extend to the country beyond the Vistula, the High Command intended to prevent from the outset any Polish attempt to establish a defensive line along the banks of the Vistula.

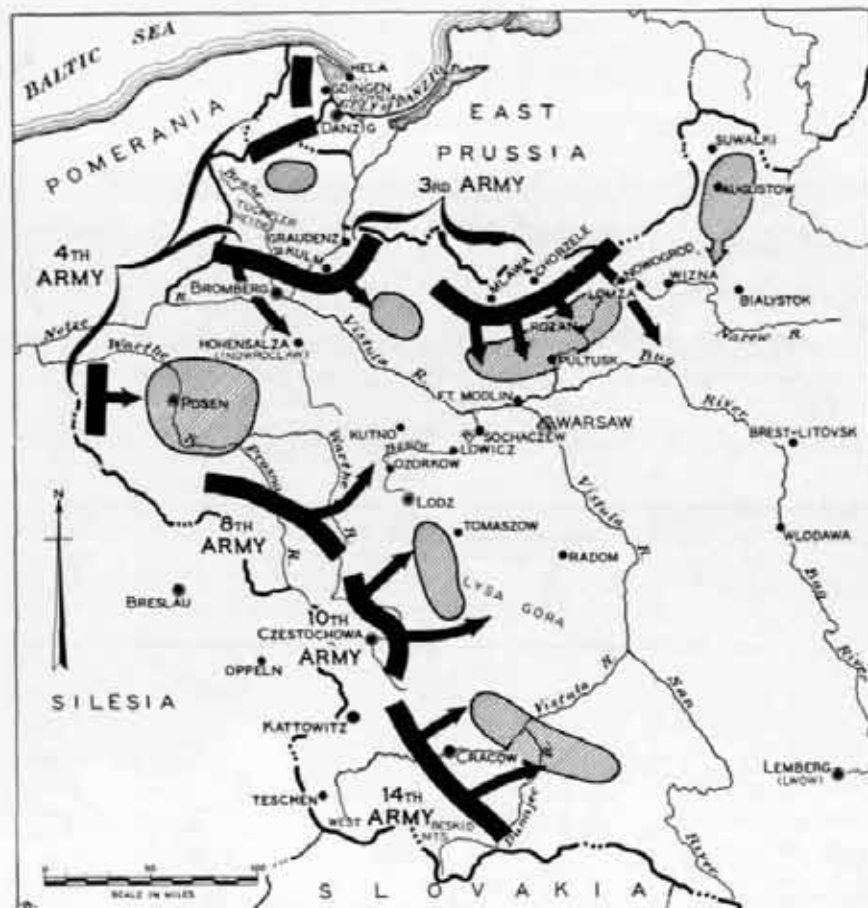
In a war which would find Germany engaged on two fronts, the Polish High Command had hoped to conduct a successful defensive until the support promised by Great Britain had taken effect. The Polish General Staff also intended to assume the offensive and defeat certain parts of the German forces on the Eastern Front.



von Brauchitsch



Smigly-Rydz



Map 2: September 4th

To support the concentric offensive on Danzig and East Prussia, the largest Polish army was closely concentrated in the region of Posen. The province of Posen protrudes into German soil in the shape of a blunt wedge, flanking the southern boundary of the province of Pomerania and the northern limits of the province of Silesia. Should the Polish forces in Posen retain the initiative during the early days of the campaign, they would be a serious threat to the flanks of any German offensive launched from the directions of Pomerania and Silesia. However, the German attack developed with such rapidity that it took the Polish forces completely by surprise. Thus threatened in flank and rear, the Polish contingents in Posen were forced to withdraw to the east before they had a chance to put up any serious resistance. The Polish Army of the South was concentrated in the area of Cracow and Lemberg (Lwow). Certain elements were assigned the mission of establishing a line of defense near Kattowitz, in order to protect the vital industrial district of

Upper Silesia. The mission of this army was defensive. Resting on the strongly fortified line of the Narew, the Polish Army of the North concentrated its forces in the area between Lomza and Mlawa. German intelligence reports indicated that it intended to invade East Prussia from the south, simultaneously with an attack on East Prussia by another Polish force from the east—that is, from the approximate region of Suwalki and Augustow.

A second strong Polish army was concentrated in the Corridor. Its mission was apparently to take Danzig by surprise and subsequently to invade East Prussia from that direction, jointly with the attacks delivered from the south and east.

The Polish High Command apparently believed the Army of the South and the units designated for the protection of the industrial region to be strong enough to ward off any German attack on this front, especially since the terrain in many places lent itself well to defensive action.

However, before the Polish High Command had a chance to convert its operations plan against Danzig and East Prussia into action, the German Army suddenly seized the initiative. The blow struck the individual Polish armies and the entire Polish dispositions in flank and rear and, from the outset of the operations, seriously



German infantry in combat formation on the edge of a town.

Map 3: September 14th

threatened the Polish lines of communications and railroads far in the interior.

The German operations developed as follows: Bavarian and Austrian mountain units of the Fourteenth Army, on the right of the Group of Armies of the South, shattered the stubborn defense of the Polish forces which were holding the passes of the West Beskids, and captured the line of fortifications extending on both sides of Teschen. Silesian and Austrian units penetrated the strongly fortified positions south of the industrial district of Upper Silesia after a brief but bitter fight. Keeping constant pressure on its opponent, the Fourteenth Army thrust the Polish forces across the Dunajec and the San. Cracow, Przemyśl, and Lemberg were taken. The Tenth Army, composed of troops from all parts of Germany, took up the advance from the region east of Oppeln and pushed on to the Polish positions along the Warthe, after hard going through the border country which had been devastated. Overrunning the hostile front on the Warthe, the Tenth Army wiped out large Polish forces at Czesłochowa and in the area south of that city. The army continued the pursuit into the region of the Lysa Gora and Tomaszow. An attack conducted astride the Lysa Gora blocked the retreat of Polish units that were



trying to escape across the Vistula. Tank units penetrated the Polish lines at Tomaszow and headed for Warsaw, reaching the city by September 8. Within a week, the Tenth Army covered a distance of around 140 miles, as



Polish infantry en route to the front.



Map 4: September 18th

ture packed with drama. Moving from the direction of Bromberg, the Fourth Army kept pushing the enemy to the southeast by way of Hohensalza (Inowroclaw), where the Eighth Army had already blocked all passages south of the Bzura. The Third Army, advancing from the north, closed the circle and frustrated the last hope of escape by way of Fort Modlin. Finally, in the east, divisions of the Tenth Army closed the vast circle at the gates of Warsaw—thus shutting off entirely the largest Polish army. The encircled Polish troops tried desperately to shatter the ring. An initial attempt to break through at Ozorkow ended in failure. The Poles made a final attack in a southeasterly direction, and German troops now had to show their mettle on the defensive. Meanwhile, the Eighth Army had cut off Warsaw from the west and southwest. Beginning with September 25, this army conducted the attack on the city from that front. Warsaw surrendered forty-eight hours later. The Fourth Army, as part of the Group of Armies of the North,

the crow flies, notwithstanding strong resistance in certain sectors. Moreover, the Tenth Army destroyed strong Polish elements in the vicinity of Radom.

The Eighth Army, advancing from the region east of Breslau, overcame the delaying action of Polish forces along the Prosna and forced the crossing of the Warthe, a natural defense sector reinforced by permanent fortifications. In close pursuit, the Eighth Army thrust back Polish forces on both sides of Lodz, forcing a withdrawal in the direction of Warsaw. The army then occupied Lodz and took up a position on the Bzura, between Lowicz and Sochaczew. This operation blocked the retreat from Posen and the Corridor. As a result there developed a great encircling operation: the Battle of the Bzura. Desperate attempts on the part of the beleaguered Poles to penetrate the German lines failed with heavy losses.

A joint operation of elements of the Fourth, Third, Eighth and Tenth Armies, under the direction of the commanding general, Group of Armies of the South, led to the destruction of the main force of the Polish army at Kutno and in the country northeast of that locality, where the Vistula bends to the west. This battle resulted from the effort of the Polish army concentrated originally around Posen to retire to the east and to head off the German advance on Warsaw. However, the Polish operation failed owing to the speedy advance of the German Tenth Army and its earlier arrival at the Vistula.

This ten-day operation of the German armies is a pic-

invaded the Corridor from Pomerania, in the area north of the Netze, and moved in the direction of the Vistula to a line on both sides of Kulm. Following in the wake of a tank thrust, the army gained the western bank of the Vistula to establish contact with East Prussia within forty-eight hours after outbreak of hostilities. Pomeranian and Brandenburg infantry broke through the heavily fortified Polish positions on the Brahe. A battle in the Tucheler Heide (Tuchola Heath) resulted in the destruction and capture of several Polish divisions and a cavalry brigade. In the northern part of the Corridor, Fourth Army units simultaneously isolated the Polish port of Gdingen (Gdynia, recently renamed Gotenhafen) and captured it later in joint action with naval forces. After seizing the city of Bromberg and crossing the Vistula with remarkable speed, the army continued the advance astride the river in the direction of Warsaw.

Parts of the Fourth Army were successfully taking part in the Battle of Bzura, but the great mass of this army was sent to the German left wing. After having proceeded on Bialystok and Brest-Litovsk, they established communication near Mlodawa with troops of the Fourteenth Army which came from the south. So a second wide outer ring closed around the Polish Army.

The Third Army, advancing from East Prussia, joined West Prussian units in bitter fighting and captured the fortress of Graudenz. In hand-to-hand combat, East Prussian infantry broke through the strong fortifications at Mlawa and the Polish line of positions along the

frontier south of Chorzele. Heavy fighting ensued at Pultusk, Rozan, Nowogrod, Lomza, and Wizna, where the Third Army forced the crossing of the strongly fortified Narew. East Prussian *landwehr* regiments distinguished themselves in these engagements. Continuing its rapid forward movement, the army forced the crossing of the Bug and pushed on in the direction of the Warsaw-Bialystok railroad. Then the main body turned toward the north and east fronts of Warsaw.

The German armies gained their objectives in a remarkably short period of time. The commander in chief of the Polish Army departed for Rumania, without awaiting the final outcome of the military operations. The garrisons of Warsaw and Modlin surrendered September 29. The naval base at Hela was the last stronghold to surrender.

Approximately 700,000 prisoners, some 40,000 horses, 1,600 guns, almost 8,000 machine guns, 500 grenade projectors, and 120 antitank guns fell into German hands, besides a wealth of other war materials.

THE AIR OPERATIONS

Two air fleets of the German Air Force, commanded by Generals Kesselring and Löhner, participated in the Polish campaign. The mission of these two air fleets was to conduct strategic air warfare in cooperation with ground forces as directed by the commander in chief of the Air Force, Field Marshal Göring.

The air fleets struck first at the Polish air forces and their ground organization. The aviation units bombed one airdrome after another, both west and east of the Vistula. Their bombs damaged and destroyed hangars, barracks, flying fields, and grounded aircraft. Other attacks were aimed at aviation plants, ammunition depots, and so on. The Polish antiaircraft artillery and pursuit aviation were unable to hinder these operations. By September 2, the air force had full control of the air over Poland.

Beginning September 3, the air force units were employed in an increasing measure against Polish lines of communication on the front and in the rear. They destroyed railroad lines and stations, bridges and roads. By preventing the reinforcement of Polish units and their movement from one part of the front to the other, the air force lent highly effective support to the advance of the German armies.

The activities of the air force contributed largely to the speed with which resistance was overcome in the Polish fortresses, especially Warsaw and Modlin.

In addition to this indirect support, the air force also lent direct support to the ground forces. Both bombers and fighters constantly attacked artillery positions, fortified zones, troop concentrations, and troops on the march or detraining or detrucking. Air-transport squadrons supplied the friendly ground forces with motor fuel, ammunition, and rations.

This continuous employment of the air force made high demands upon the flying personnel and the matériel, and that force cooperated efficiently with the ground forces throughout the campaign leading to a rapid success.

THE NAVAL OPERATIONS

Units of the German Navy blocked the Bay of Danzig and so prevented any communication by sea with Polish ports. Virtually all Polish naval forces in the Baltic were destroyed or captured. The German training cruisers *Schleswig-Holstein* and *Schlesien* supported the land operations by firing on Polish coast artillery positions located south of Gdingen and on Hela Peninsula.

CONCLUSIONS

When compared with the results, the German casualties may be regarded as small. In this connection, Chancellor Hitler stated in his address to the Reichstag October 6, 1939: "According to figures available September 30, 1939—which will hardly be subject to any major changes—the casualties of the Army, Navy and Air Force, both officers and men, are: 10,572 dead; 30,322 wounded; and 3,409 missing."

The losses of motor transportation, tanks, and so on, likewise were small.

To what may the surprisingly swift success of German arms in the Polish campaign be attributed?

In addition to the remarkable performances of the German forces, it was the splendid cooperation of all arms and especially the close coordination of the land and air forces which contributed to the speedy and successful conclusion of the campaign.

The Polish soldier was tenacious, stubborn and brave; yet he failed because of the incompetence of his leadership and the shortcomings of his organization.

All arms shared equally in the successful operations. Their peacetime training proved its worth during attacks on hostile positions quite a few of which were strongly fortified. In addition to the rapid advances by the mechanized and motorized units, the infantry's accomplishments both in combat and on the march were outstanding. The crossing of rivers and streams confronted the engineer units with most difficult tasks, owing to the destruction of many bridges.

The German combat regulations, aimed as they are toward instilling self-reliance and initiative in the individual, were found sound in every respect. The German soldier also showed superiority in the field of close combat. That means a great deal, for in many instances the Polish soldier revealed himself an obstinate fighting man.

The equipment of the German soldier likewise proved to be entirely adapted to wartime conditions. Whereas in 1914 the equipment of the German troops necessitated modifications after the very first engagements, we can say today that the arms, ammunition, and equipment of all arms fully meet the requirements of modern war.

In the campaign the troops did not have to revise the tactics they had learned in peace. Their combat training satisfied the demands of war. That was especially true of the systematic training of the individual soldier in the exploitation of the ground and in camouflage.



Campaign

German columns at crossroad within the Polish frontier

German bombers over Poland



portion of a German "light" division in the suburbs of Cracow





In Poland



Manhandling transportation across muddy roads

Bombers attack railroad yards

*Motorized artillery crossing the Br...
over a temporary bridge*





Above: Railroad installations are guarded by light AA guns

Below: Field Artillery in action. The cordon of freight cars may serve as a barrier to the roving tank



*Above: A Polish plane that crashed
Below: The debris of war along a Polish road*



After the fight in the Tübeler Heide. Note dead horse

A light machine-gun section tramping through the streets of a Polish village

A new use for a light AA gun—street fighting





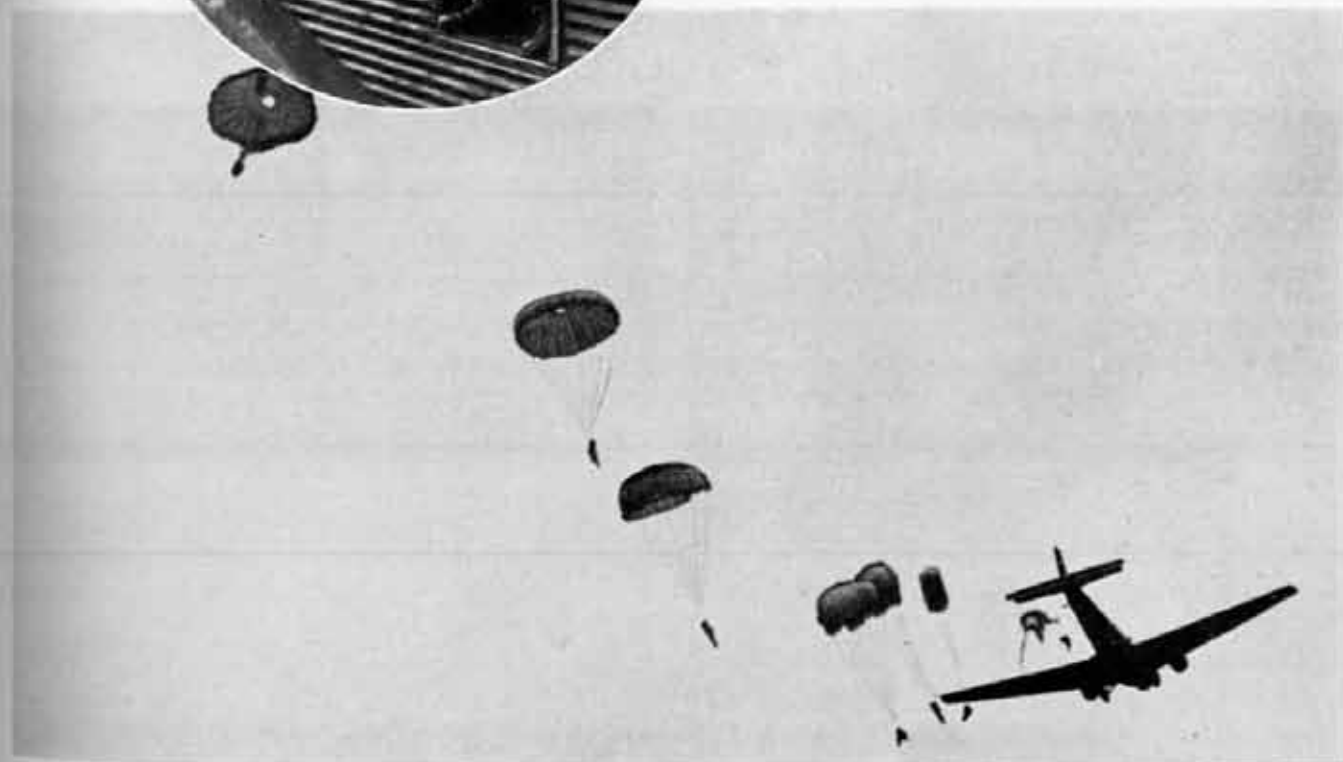
Parachute troops en route to a jump



PARACHUTE TROOP TRAINING

Over the side

Headed toward the ground



Identification of Camera Films

By SERGEANT H. E. DeFLORIN

Headquarters Battery, 265th Coast Artillery (HD), Florida National Guard

With respect to the duties of the camera record detail in target practice (seacoast armament), Training Manual 2160-35 specifies that the films recording the target and splashes be marked carefully for identification purposes. While it is true that with a bit of care in exposure and processing this can be accomplished quite easily, nevertheless a foolproof, ironclad system of identification has long been needed. The usual solution of the problem is a bulletin board of some type set up at the stern of the tug to be included in the view of the camera.

During the 1939 annual encampment of the 265th Coast Artillery at Key West, Florida, a method was used that apparently is the nearest approach to the desired ideal. So simple is its application that the writer confesses to some shame that nearly two years elapsed before the working model evolved from suggestions put forth by Captain S. S. Barchan and Lieutenant R. W. Cooper, Jr., of the 265th Coast Artillery.

Essentially, the method employed comprises a very simple device to record automatically the pertinent information as date, place, battery firing, the direction of the battery, etc., and another device for recording on each negative the time of the exposure to the nearest second. Both of these devices are self-contained within the camera and enable the photographer to move about to the most advantageous position. This position, of course, should be directly over the end of the towing line. This leaves him free to concentrate on the business of photographing target and splash, without having to worry about the pos-

sibility of including other things in the view which might obscure one or both of the elements aimed at.

As may be seen in figure 1, the so called "pertinent" information to be automatically recorded is lettered with India ink on a transparent celluloid strip about .030 in thickness, held somewhere close to the focal plane of the camera. Although its position is not at all critical, the transparent strip should be within $\frac{1}{4}$ " of the film in order to prevent the lettering from fuzzing and flaring too much as the light is projected through it. When we used the device, the strip was bent somewhat more than at right angles and slipped into two phosphor-bronze spring clips fastened by small screws to the inside of the camera and bent so as to bind the celluloid strip against the beveled rim in front of the plate or film holder. It was found advisable to round and slightly bend the free corner of the strip next to the time recorder and hook the other end behind a small pin pressed into the edge of the bevel in order to prevent possible fouling as the film pack adapter was slid in or out. It may be noted here that the devices are installed on the bottom edge of the camera thereby utilizing what would otherwise be sky space. Once the exposure is made, the lettering is recorded unfailingly.

The time recorder, which identifies the individual splash in a series of shots, is somewhat more involved as regards construction, but is based on simple principles of physics and optics. In the dead space in one corner of the inside of the camera a light tight box is installed, carrying

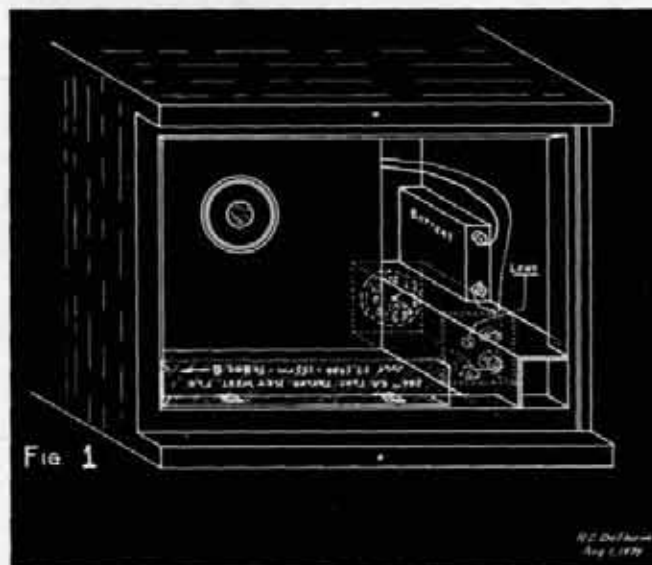


Figure 1: Information to be recorded is lettered on a transparent celluloid strip held close to the focal plane of the camera.

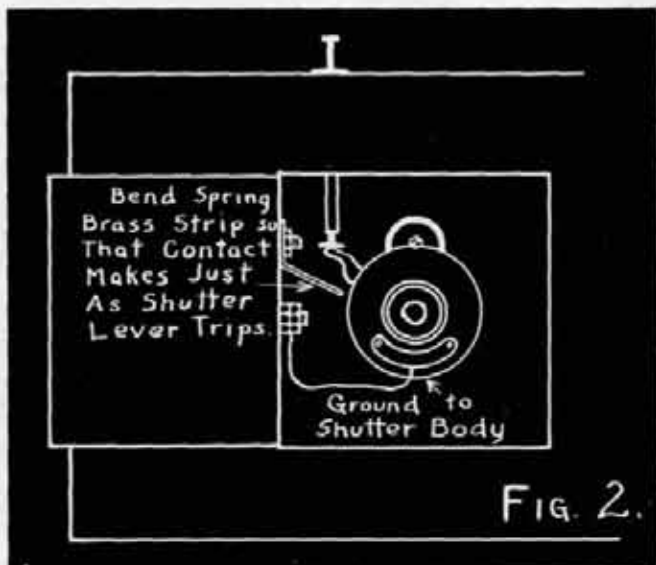


Figure 2: The leads of the switch operating in conjunction with the shutter are connected to two small screws installed in small holes drilled through the camera case.



265th C.A.-Fort Taylor-Key West, Fla.
July 17, 1939-155mm Gun-To Battery "E" →



265th C.A.-Fort Taylor-Key West, Fla.
July 17, 1939-155mm Gun-To Battery "E" →

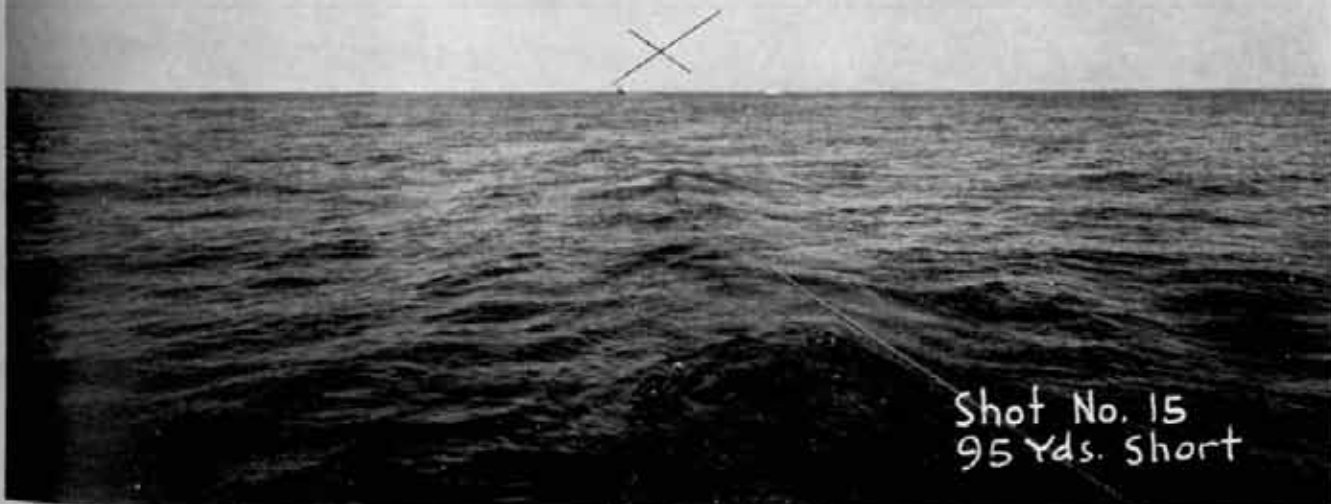


Figure 3: These photographs show the results attained by the use of the timepiece and celluloid strip mounted within the camera.

a watch, three flashlight bulbs, and a small convex lens in a partition, all arranged so as to constitute a small reflection type projection printer. The object is the timepiece at the front end, and the image is projected to the film when the lamps are lit by means of a small battery connected to a switch operating with the camera shutter push button.

The model actually constructed and used leaves much to be desired by way of convenience, because it was designed to determine its worth without unduly damaging or disfiguring the camera. It is easy to visualize a construction that would permit easy changing of bulbs and battery when necessary, as well as to give accessibility to the timepiece without removal of the unit. Now that we have definitely established the value of the unit, such revisions of construction are under consideration.

The switch operating in conjunction with the shutter is of simple contact type. Its leads are connected to two small screws installed in small holes drilled through the camera case as shown in figure 2. Theoretically, a trip switch giving a definite contact time whenever the shutter is actuated should be used here. However, it was found that the exposure necessary to impress the image of the watch was by no means critical, being on the order of a fifth or quarter of a second and varying up to three or four times that amount. Therefore the switch arranged as described proved entirely practical in normal operation without adding any complicated machinery that would require adjustment or attention. Although its construction could also be improved, the simple contact principle should prove adequate.

These devices furnished all that could be desired in the matter of film identification. (See figure 3.) In fact, 120 exposures covering the firing of four separate batteries on two different days were developed at one time without regard to sequence or marking in any way, and were assorted after drying without the slightest difficulty, even though many exposures were made at intervals of two seconds.

It is interesting to note that the recorded time could be checked in a few seconds with the official timekeeper's record, allowing for differences in time of flight and in setting of the timepieces. It is possible to check the camera watch with the timekeeper's watch even though they will not run together, by making a blank exposure before and after the record firing and noting the time of each as shown by the timekeeper's watch. These figures then can be used to plot a curve or otherwise determine a correcting factor, enabling also the use of two cameras with times staggered by several hours to avoid confusion. While it is apparent that the accuracy of the time recorder is dependent on the precision of the timepiece, everyone was well pleased with the performance given by a second-hand Ingersoll wrist watch, purchased for \$1.50. The entire cost of our trial model time recorder reached \$2.40.

The attachments described can be easily duplicated by a little effort and ingenuity on the part of any interested parties. If more detailed information is desired queries should be addressed to Captain S. S. Barchan, Headquarters Battery, 265th Coast Artillery (HD), Duval County Armory, Jacksonville, Florida.



STAFF AND FACULTY, COAST ARTILLERY SCHOOL, 1939-1940

Standing, left to right: Majors Morrison, Lewis, Hartman, Paul (AC), Captains Madison, Merritt, Pamplin, Vander-sluys, Stevens, Holcomb, Chester, Bender, McNamee.

Seated, left to right: Majors McNeely, Cochran, Dennis, Foltz, Lieutenant Colonels Poland (Inf.), Pendleton, Colonel Cox, Brigadier General Smith, Lieutenant Colonels Nichols, Weeks, Robison, Majors Lowry, Griggs, Anderson, Dockler (Cav.).

A Suggested Service of the Piece, 37-mm. Gun

By Captain J. E. Reiersen, Coast Artillery Corps

(The drill suggested herein is purely experimental, is *not* regulation, and has *not* been approved by the War Department. It does not have the force of regulations. Captain Reiersen has tested this drill at Fort Monroe and has obtained satisfactory results. THE EDITOR.)

EMPLACING 37-MM. GUN M1938 M1E1, CARRIAGE T2E1

DETAIL	PREPARE FOR ACTION!	TRIP! LEVERS DOWN!	LEVEL CARRIAGE!
GUN COMMANDER	Commands: "Prepare for Action!" Supervises emplacement.	Commands: "Trip!" and as soon as carriage has hit the ground commands: "Levers Down!" Assists any detail who is unable to operate his lever.	Commands: "Level Carriage!" Unlocks gun, checks level, and bore-sights gun assisted by gun pointers. Checks cables to see that they are properly connected. Checks ammunition to see that the designated amount is convenient to gun.
LATERAL GUN POINTER	Checks positions of Nos. 1 and 3 and places hands on tripping and locking levers at rear end of carriage.	At command "Trip" he operates locking and tripping levers. Assists Nos. 1 and 3 if necessary.	Places sight in carriage. Points bore on aiming point, as directed by gun commander.
NO. 1	Takes post at left rear of carriage with both feet on counterpoise lever.	Forces lever down as carriage touches ground.	Lowers and adjusts left outrigger. Centers bubble in level. Assists No. 2 in removing covers.
NO. 3	Takes post at right rear of carriage with both feet on counterpoise lever.	Forces lever down as carriage touches ground.	Assisted by No. 4 obtains ammunition and places it near outriggers on either side of carriage.
VERTICAL GUN POINTER	Checks positions of Nos. 2 and 4 and places hands on tripping and locking levers at front end of carriage.	At command "Trip" he operates locking and tripping levers. Assists Nos. 2 and 4 if necessary.	Places sight in carriage. Points bore on aiming point, as directed by gun commander. Assists gun commander in pointing sight on aiming point. (See Note.)
NO. 2	Takes post at right front of carriage with both hands on counterpoise lever.	Forces lever down as carriage touches ground.	Lowers and adjusts right outrigger. Centers bubble in level. Assisted by No. 1 removes covers.
NO. 4	Takes post at left front of carriage with both hands on counterpoise lever.	Forces lever down as carriage touches ground.	Assists No. 3 in obtaining and placing ammunition.

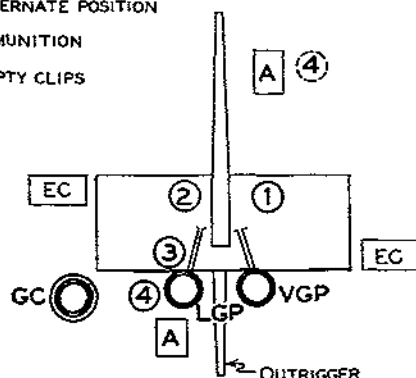
NOTE: Gun Commander rotates cables, by using a special socket wrench, thus pointing sights on aiming point.

GUN DRILL 37MM GUN M1E1 ON T2E1 CARRIAGE

○ ALTERNATE POSITION

A AMMUNITION

EC EMPTY CLIPS

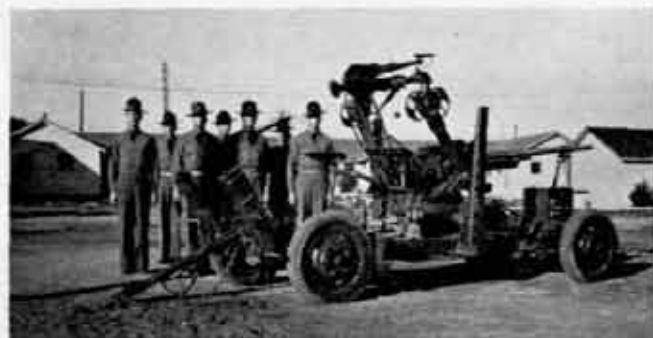


"DETAILS POSTS"



GC GUN COMMANDER
LGP LATERAL GUN POINTER
VGP VERTICAL GUN POINTER
1 ASSISTANT LOADER
2 LOADER
3 AMMUNITION RELAY
4 AMMUNITION DETAIL

"FALL IN"



"Fall in!"



"Prepare for action!"

MARCH ORDER 37-MM. GUN M1938 M1E1, CARRIAGE T2E1

DETAIL	MARCH, ORDER!	READY! LEVERS UP!
GUN COM-MANDER	Repeats command. Raises traveling lock bracket and locks gun. Supervises work of section.	Commands: "Ready!" "Levers Up!" Assists any detail unable to operate his lever. Directs chauffeur to bring up truck. Checks to see that locking levers are engaged, outriggers and gun secure. Supervises loading of truck and coupling of gun to truck.
LATERAL GUN POINTER	Traverses gun to traveling lock. Replaces sight. Takes post at rear end of carriage.	At "Ready" places either hand on tripping lever. Checks to see that Nos. 2 and 4 are ready. At "Levers Up" assists either detail if latter requires it and at the same time pulls tripping lever until locking lever is engaged. Assists in loading truck. Assists vertical gun pointer couple carriage to truck.
NO. 1	Raises and locks left outrigger as soon as gun has cleared. Takes post at left rear of carriage convenient to counterpoise lever.	At "Ready" grasps counterpoise lever with both hands. At "Levers Up," lifts lever until carriage is raised. Assists No. 2 in covering muzzle and water chest. Assists in loading truck.
NO. 3	Takes post at right rear of carriage convenient to counterpoise lever.	At "Ready" grasps counterpoise lever with both hands. At "Levers Up," lifts lever until carriage is raised. Assisted by No. 4 loads ammunition in truck.
VERTICAL GUN POINTER	Depresses (or elevates) gun to traveling lock. Replaces sight. Takes post at front end of carriage.	At "Ready" places either hand on tripping lever. Checks to see that Nos. 2 and 4 are ready. At "Levers Up," he assists either detail if latter requires it and at same time pushes tripping lever forward until locking lever is engaged. Assists in loading truck. Assisted by lateral gun pointer, couples carriage to truck.
NO. 2	Raises and locks right outrigger as soon as gun has cleared. Takes post at right front of carriage convenient to counterpoise lever.	At "Ready" grasps counterpoise lever with both hands. At "Levers Up" lifts lever until carriage is raised. Assisted by No. 1 covers muzzle and water chest. Assists in loading truck.
NO. 4	Returns loaded ammunition to chests. Takes post at left front of carriage convenient to counterpoise lever.	At "Ready" grasps lever with both hands. At "Levers Up," lifts lever until carriage is raised. Assists in loading ammunition in truck.



"Commence firing!"



"March order!"

DETAIL	DETAILS. POSTS!	(a) EXAMINE, GUN! (b) REPORT!	TARGET!	COMMENCE FIRING!	(a) SUSPEND FIRING! (b) CEASE FIRING!
GUN COMMANDER	Repeats command. Procures tool kit and takes post where he can supervise.	(a) Repeats command. Supervises work of squad. Checks filling of recoil cylinder. (b) Repeats command and receives reports from lateral and vertical gun pointers, Nos. 1, 2, and 3. Reports to chief of section, "No. . . in order," or any defects he is unable to remedy without delay.	Repeats command. Reports "No. . . on target" as soon as gun pointers have reported.	Commands "Load" and supervises service of the piece.	(a) Signals vertical gun pointer to lift foot from pedal by whistle or slap on back. (b) Same as in (a). Supervises unloading of gun.
LATERAL GUN POINTER	Takes post on left seat of carriage.	Examines and adjusts sighting and traversing mechanism. Reports to the gun commander, "Sighting and traversing in order," or any defects he is unable to remedy without delay.	Trains his sight on designated target, calls out "On target" and tracks without further command, keeping sight continuously on target for direction by traversing the gun.	Continues tracking target.	(a) Continues tracking target. (b) Stops tracking target, but remains at his post awaiting further orders.
NO. 1 ASSISTANT LOADER	Procures recoil oil, wrench, priming rod, and waste, places them convenient to gun. Takes post to the right of piece, opposite to and facing breech.	Fills recoil cylinder under direction of gun commander. Examines chamber and bore, and, if necessary, calls upon No. 3 for assistance in sponging chamber and bore. Reports to gun commander, "Recoil mechanism and bore in order," or any defects he is unable to remedy without delay.	Pulls carrier to rear and locked position, by means of priming rod. Takes post at right of and facing breech.	Receives empty, ammunition clips from right side of breech and tosses them clear of gun.	(a) No duties. (b) Assists No. 2 in unloading gun, but remains at his post awaiting further orders. If called on, assists No. 2 in attaching hose and pumping water.
NO. 3 AMMUNITION RELAYER	Assisted by No. 4 procures ammunition and takes post on left side of piece convenient to feedway.	Assisted by No. 4 prepares ammunition. Places boxes of loaded clips on either side of outriggers. Reports to gun commander "Ammunition in order."	Places loaded clip on feedway.	Continues placing clips on feedway convenient to No. 2.	(a) Keeps ammunition in readiness. (b) Replaces ammunition in boxes.
VERTICAL GUN POINTER	Takes post on right seat of carriage.	Examines and adjusts sighting and elevating mechanism. Reports to gun commander "Sighting and elevating in order," or any defects he is unable to remedy without delay.	Trains his sight on designated target, calls out "On target" and tracks without further command, keeping sight continuously on target in elevation, by elevating or depressing gun.	Continues tracking target. At command "Firing" pushes down on trigger pedal with foot, and continues pushing pedal down until "Suspend Firing" or "Cease Firing" is given.	(a) Lifts foot from pedal and continues tracking target. (b) Lifts foot from pedal and stops tracking target, but remains at his post awaiting further orders.
NO. 2 LOADER	Procures oil and waste and places them convenient to gun. Takes post on left side of piece, opposite to and facing breech.	(a) Examines water chest and hose and if water is needed he calls on Nos. 3 and 4. Examines, cleans and oil breech mechanism, breech block, feed mechanism and trigger mechanism. (b) Reports to gun commander "Gun and water chest in order," or any defects he is unable to remedy without delay.	Calls "Ammunition." Receives ammunition from No. 3 and places a loaded clip on feedway. Calls "Prime" to No. 1 and holds stripper up until carrier is locked in rear position.	At command "Load" pushes loaded clip up against cartridge stop, pulls cartridge stop lever left, pushes loaded clip on into receiver until stripper is tripped, letting carrier go forward and loading first round. Continues feeding clips until "Suspend Firing" or "Cease Firing" is given.	(a) Keeps ammunition in place, on feedway. (b) Assisted by No. 1 unloads gun and if called upon by gun commander attaches hose to breech and muzzle of gun. (a) Stands by.
NO. 4 AMMUNITION DETAIL	Assists No. 3 in procuring ammunition. Takes post at ammunition box convenient to No.	Assists No. 3 in preparing ammunition and clips.	Feeds ammunition to No. 3.	Continues feeding ammunition to No. 3.	(b) Receives unfired ammunition from No. 3. Replenishes ammunition.

The Recruit and His Army

By Lieutenant C. Robert Bard, Coast Artillery Corps

The problem of parents who awake to reality to find themselves possessed of triplets is simple indeed compared to the problem of a company commander who takes into his company for training even one recruit. The parents have in effect a clean slate upon which to write what they choose. True, the chalk with which they write is sometimes colored by heredity, but the final equation—where x equals success or failure—is the parents' own work. In some respects, the work of the company commander is similar, but in others, far different. He has no newly created slate upon which to write. His equations must be set up on a board already scrawled upon by a host of other writers—the city, the farm, the mill, the forest, and even crime and ignorance. He must not only write over and between these lines, but he must also use some of their figures, for what the representatives of life and time have written, none may erase. His greatest problem, then, is to use chalk of glowing and impressive colors, to write with a vigorous and certain hand, that his work may stand out above the others.

The question then arises "How is the company commander to assure his successful writing? How can he reach a correct answer in the solution of his recruit?" This is a question of no small importance, for a sound, well-trained soldier with a keen sense of loyalty to his army, is of more value than a host of death-dealing weapons. On the battlefield the soldier must handle the guns; after the war is over, he must re-build and govern ravaged countries and bewildered peoples.

Let us examine the average recruit and see what avenue of approach will be most effective in teaching him. We find him healthy, clean, and active in body. He is intelligent and possesses a goodly share of what we Americans fondly call horse-sense. And, most important of all, he is proud of many things—of his country's power, his nationality, himself. This deep racial pride is perhaps the most sensitive thing about him, and in it we find a means of appealing to him and impressing him with the seriousness of his new position as a soldier.

This last remark suggests our first step. Let us institute a lecture course under the guidance of a capable instructor. The recruit should learn something of the history of the

army of which he is a small but significant part. We must remove from our instruction any vestige of a hint that this part of the training is only a stop gap for rainy days rather than essential knowledge. It must be given a distinct and important place in the training schedule; it must never become incidental, haphazard, or frivolous.

To insure that instruction in army history be considered as important as drilling, extreme care must be taken to secure instructors who are thoroughly saturated in the subject. The normal officer's usual knowledge of military history is not enough. The officer chosen should have prepared himself by much extra reading in military history. One might suggest such books as Fiske's *The American Revolution*, Henderson's *Stonewall Jackson and the American Civil War*, Hart's *The Monroe Doctrine*, and Latane's *The History of American Foreign Policy*—to name but a few.

From his store of historical knowledge the instructor should select topics that will appeal to the love of adventure in his young listeners and that will also show them that the army's record is one to be proud of. He will find the Revolutionary War especially rich in suitable topics—the hardships endured by the Continentals at Valley Forge, the dashing exploits of the Green Mountain Boys, the noble example of courage and fortitude set by Washington. This type of instruction should occupy at least two lectures during the recruit training period. At its conclusion the recruit will have a stirring picture of the origins of the army; he will know for himself its meager beginnings and how gloriously it has grown to its present stature.

This part of the training completed, the next step should be to describe the present structure of the army. Here especial emphasis should be placed upon describing the army as a wide-flung yet very closely knit state or city, self-governing, self-administering, self-sufficient save for the foodstuffs and supplies which every community must secure from outside sources. In this way the recruit will see the army from familiar ground. He is already familiar with the city or the country town and the state; and when he learns that the commander in chief is like a governor, that the corps areas are like counties and army posts like

A soldier with a keen sense of loyalty is of more value than a host of death-dealing weapons

towns and cities, he will be less afraid of the vast, strange organization into which he has been thrust. In this phase of the instruction as in the first, the instructor must be thoroughly familiar with his subject; he can hope to arouse little enthusiasm in his listeners if he himself is not sincere.

Proceeding from the large view of the army, the lectures should then proceed to a more detailed explanation of the structure. The various arms and branches of the service should be described, with particular emphasis upon the inter-dependence and mutual reliance of the different parts. Here the instructor may place himself upon ground familiar to his audience by comparing the branches to the men of a football team, each with a duty to perform on both defense and offense. The teamwork idea can be followed downward through the entire military structure from the army through the regiments and companies—down to the unit that makes the whole—the man himself.

The soldier must be led to realize that he is important to the team and that his every duty regardless of momentary pleasure or disgust is part of the play that will win the game. I can state from personal experience that this attitude is most desirable. Enlisting in the Field Artillery in 1926 for the purely selfish reason of securing an appointment to the Military Academy, I spent a disgruntled and bewildered year trying to adjust myself to an unfamiliar, mystifying, and apparently aimless existence. A few words along the lines described above would have done much to orient my befuddled wits and would undoubtedly have made me a better soldier. One hour of instruction would have accomplished something that took me a year to figure out for myself. Unfortunately, not every recruit has the opportunity to discover these truths; he must secure the answer from someone he can trust, someone upon whom he can rely—his officers.

So far our recruit training course has ignored discipline. Our soldier has been in the service for about three days, and except for what he has heard from unreliable sources (men with some slight—and distorted—knowledge of things military) he has no suspicion that he is bound by rules and regulations of a higher degree than those issued by his sergeant. Our stress so far has been on making the recruit feel at home in a strange household, acquainting him with the family and explaining various ancestors. As he has been well cared for, well-fed, well-housed, comfortably clad, and promptly healed if he became ill, the recruit begins to feel that he is at least an adopted son of a well-to-do, respectable family. At this point his instruction should turn to the laws that govern the army—the Articles of War.

The first step should be to explain the title of the military code in order to divest it of the rigor implied by the

word "war" and to invest it with the kinder dignity of the civil laws with which he is more or less familiar. This phase of the instruction, like the others, must be made important and seriously high-minded. Perhaps here again the recruit can be led to apply a familiar rule and to realize that the Articles of War are in reality nothing but the rules of a game played by a well-trained, efficient soldier. He should be shown that the Articles of War do not exist simply to provide punishment. His common sense will make him realize that the military structure is not strengthened or that morale, pride, and ambition are not increased by penalties. If he is shown that the Articles protect the army and its soldiers by pointing out those acts of commission or omission that would sap the strength of the whole body, he will revise his boyhood dictum of "The crime is not in doing it, but in getting caught" to read "The crime is in doing anything that makes my army a less desirable community or a weaker team." However, he must not avoid the fact that some members of the team will break the rules, nor must he belittle the realization that punishment is swift and certain. He is learning to play an important game, one in which he defends not a line or a netted hoop, but his country; one in which the prize is not a cup or acclaim, but the more precious one of freedom. The rules must be hard. They must be enforced.

In connection with his understanding of the Articles of War, the recruit should be taught that since his officers are older, wiser, and more experienced, they are always mindful of Baron von Steuben's advice to a commander: "to gain the love of his men by treating them with every possible kindness and consideration, inquiring into their complaints, and when well founded, seeing them redressed." The recruit should regard his command much as the ancient Jews did Abbethidin, their great justice, who sat always

"Unbribed, unsought, the wretched to redress;
Swift of dispatch, easy of access."

Once the recruit discovers his officers to be prompt and just solvers of his troubles, he will soon learn to avoid by following their guidance, the disturbances, emotional or physical, that lead from trouble to the guardhouse.

The training plan outlined has logic and simplicity. It requires only enthusiasm and a slight amount of additional study on topics of great and lasting interest. It appeals to the sense of pride and fair play which is the birthright of every American youth. By bringing the company commander before his soldiers in the rôle of an understanding teacher, the plan will greatly foster and strengthen their faith and trust in him. And finally, and perhaps most important of all, it gives the recruit a firm foundation for the future.



THE 621st WINS TROPHY

The 621st Coast Artillery (HD), Organized Reserves, with headquarters at Wilmington, Delaware, has been adjudged the 1939 winner of the trophy awarded annually in the nation wide contest sponsored by the Coast Artillery Association for the regiment making the best record during the extension course school year. The 621st won this signal honor after a thorough check of the Army Extension Course records of scores of regiments. The competition for the award is based on plans formulated by the Executive Council, U. S. Coast Artillery Association.



621st Coast Artillery (HD)

Briefly stated, here are the details that govern the annual competition:

REGIMENTAL TROPHY

1. The Coast Artillery Association regimental trophy is awarded annually to the Reserve or Regular regiment having Reserve officers assigned, that attains the highest figure of merit for the year.

2. The figure of merit will be the sum of the following two components:

- a. The total number of credit hours earned during the year by completed extension school subcourses and command and general staff lessons will be divided by the average strength of the regiment.
 - b. The number of officers who earned forty or more credit hours during the year by completed extension school subcourses or command and general staff lessons will be divided by the average strength of the regiment. This quotient expressed as a decimal will be multiplied by 100.
3. a. The average strength of the regiment is the average of its strength on December 31st and on June 30th.
- b. The competition year is from July 1st to June 30th.
- c. A regiment must have a strength of twenty-five or more officers to be eligible for the award.
- d. In computing the component in paragraph 2 a above, no officer will be credited with more than 100 hours.
- e. The term "officer" applies to Coast Artillery Reserve officers only, assigned or attached.
- f. Only subcourses and command and general staff lessons completed while a member of a regiment will be credited to that regiment.
- g. Subcourses must be appropriate to the officer's

grade or the next higher grade; that is, for first lieutenants the 30 or 40 Series; except a colonel or an officer holding a certificate of capacity for colonel, may be credited with any courses approved by the corps area for obtaining eligibility for camp attendance.

- b. Coast Artillery subcourses and command and general staff lessons only will be credited except as authorized in paragraph 3 g above.
- i. The date of issue of a subcourse certificate determines when the hours of credit it represents were earned. The date appearing in the "received from student" column on the lesson assignment card determines when hours of credit were earned for command and general staff lessons.
- j. When subcourses are issued in parts (designated by Roman numerals) such parts shall be considered as subcourses.
- k. Second lieutenants exempted from examinations and tests by Section II, Circular No. 81, War Department, 1936, will not be included in the strength of a regiment nor will correspondence work done by them be credited except as follows: If a second lieutenant, so exempted, completes subcourses during the year totaling twenty hours or more he will be included in the strength of the regiment and his work credited to the unit under the same conditions as for other officers.

It will readily be seen that the plan of award emphasizes the training of the Reserve officer with a view to his ultimate use in an emergency. The organizations competing were not merely piling up credit hours, they were preparing their personnel for the ultimate test of any officer—fitness to take the field. It follows that the Association's award has a definite place of high importance in the Corps' training scheme.

Although the 621st is carried as an inactive unit of the

Standing of Corps Areas

Corps Area	Average Figure of Merit
Ninth	69.081
Seventh	62.732
Eighth	57.177
First	55.891
Second	50.496
Third	44.159
Fourth	31.420
Fifth	29.995
Sixth	26.726

Standing of the First Ten Regiments

Regiment	Score	Corps Area
1. 621st C.A. (HD)	181.735	Second
2. 507th C.A. (AA)	123.116	Seventh
3. 523d C.A. (AA)	107.087	Third
4. 65th C.A. (AA)	98.160	Ninth
5. 977th C.A. (AA)	95.113	Ninth
6. 63d C.A. (AA)	94.087	Ninth
7. 906th C.A. (AA)	93.156	First
8. 509th C.A. (AA)	90.620	Ninth
9. 14th C.A. (AA)	90.281	Ninth
10. 614th C.A. (HD)	88.150	First

Regular Army, in reality it is a Delaware regiment, and in the event of war would fill its ranks largely with the young men of that state. Its officer roster at present consists almost entirely of Delaware citizens who have given their time and effort to prepare themselves in time of peace in order to become efficient leaders of Delaware men in time of war.

Intensive home study that enabled the 621st to win the 1939 trophy is supplemented by practical training with troops during the summer months. It will be recalled that the 621st was one of the regiments making a splendid showing during its active duty training last summer at Fort Hancock, when it destroyed a target with a direct hit during its annual service practice.

Although the 621st has a brilliant peacetime record it does not have a heritage of service in the World War. Created in 1924 under the National Defense Act, its original roster was largely made up of Reserve officers transferred from other branches of the service. Shortly thereafter, the ROTC at the University of Delaware became a Coast Artillery unit and many of its graduates were subsequently assigned to the 621st. At present the regiment is for the most part composed of Delaware ROTC officers. The bulk of its officers are professionally employed as engineer, research and sales executives in the great technical industries centered in the Wilmington area. In no small degree these circumstances contribute to an enviable unity and esprit de corps that is daily evidenced throughout the organization and all its activities.

In addition to its regular periods of active duty conducted in alternate years at Fort Hancock, the regiment conducts contact camps each spring, usually at Fort Du Pont, Delaware. Always prominent in the affairs of the Reserve Officers' Association, it numbers on its roster three of the last six presidents of the Department of Delaware.

The regimental commander, Colonel Archibald E. Tanner, has a background of long and varied experience in military and civil life. Descended from a family already rich in military tradition, he was connected with the National Guard for many years before the World War and served as an officer during that conflict. A graduate of the special course at the Command and General Staff School, he has commanded the 621st since its organization. Colo-

Standing of First Three Regiments in Each Corps Area

FIRST CORPS AREA

906th CA (AA)	93.156
614th CA (HD)	88.150
607th CA (TD)	66.392

SECOND CORPS AREA

621st CA (HD)	181.735
514th CA (AA)	81.340
533d CA (AA)	51.033

THIRD CORPS AREA

523d CA (AA)	107.087
508th CA (AA)	87.070
503d CA (AA)	83.056

FOURTH CORPS AREA

504th CA (AA)	40.430
534th CA (AA)	40.293
925th CA (AA)	38.364

FIFTH CORPS AREA

535th CA (AA)	63.205
932d CA (AA)	36.213
511th CA (AA)	32.641

SIXTH CORPS AREA

951st CA (AA)	37.537
506th CA (AA)	30.238
61st CA (AA)	28.322

SEVENTH CORPS AREA

507th CA (AA)	123.116
960th CA (AA)	73.517
958th CA (AA)	66.925

EIGHTH CORPS AREA

624th CA (AA)	68.999
972d CA (AA)	68.080
69th CA (AA)	62.024

NINTH CORPS AREA

65th CA (AA)	98.160
977th CA (AA)	95.113
63d CA (AA)	94.087

nel Tanner was a moving spirit in the organization of the Department of Delaware, Reserve Officers' Association and also served as one of its first presidents. Long recognized as one of the most successful Reserve officers in the field of morale and leadership, he is frequently consulted by military authorities. In civil life a director of employee recreational activities in a large industrial organization, he is equally well known as an educator, and as an expert in the field of industrial welfare.

The regiment has been equally fortunate in the inspiration and guidance it has received from the succession of outstanding regular officers assigned as unit instructors.

Colonel H. LeR. Muller, Coast Artillery Corps at present in charge of all Reserve and CMTC activities in Delaware had a large part in the creation and execution of the training program of the past several years which led to the recent achievement. This plan is based on the responsibility of each unit commander for the training of his unit. Each individual has an objective based on the regimental objective, his assignment, and the requirements for promotion. Needless to say, many officers of the 621st hold certificates of capacity granted by the War Department certifying that the officer is qualifying for the duties of his next higher grade. Among the instructors who helped build the 621st Coast Artillery, were Colonel Meade Wildrick, retired, now residing at New York City; and Lieutenant Colonel William Cravens, Coast Artillery Corps, now stationed at Schenectady, New York.



Col. Archibald E. Tanner
Commanding 621st
Coast Artillery (HD)

As an A Type harbor defense regiment, the 621st Coast Artillery has a three-battalion organization and mans a varied assortment of matériel: searchlights, guns, mortars and antiaircraft weapons; medium and major caliber armament. The extension school work on which the award was based, therefore consisted of a varied assortment of courses. These comprised Command and General Staff Extension School courses, and the 40, 30, and 20 series of the Coast Artillery Corps series.

The officers of the regiment ascribe the results achieved during the 1938-1939 school year, to a *planned* four-year course of training which would culminate in a serious bid for the award. That is, they believe that long-range planning is the first step in bringing a Reserve regiment to a high state of training. The rest is merely yeoman work in adhering strictly to schedule.

This idea—as a training policy of the War Department

—is now called a “training cycle.” That the 621st Coast Artillery was able to reach its objective in three instead of four years is an indication of the importance of a cycle of training for Reserve regiments.

Another feature of the 621st plan of training that may interest other regiments is the inclusion of group school instruction for parallel study with extension school work. This instruction includes conferences in leadership; tactics; logistics; historical studies; monthly presentation of current campaigns; and the latest thought from service periodicals—such as the *COAST ARTILLERY JOURNAL*, *Infantry Journal*, and *The Command and General Staff School Quarterly*.

The extension courses thus provide the theoretical foundation of knowing one's profession; current military literature provides the medium for keeping abreast of the profession of arms.

There can be little doubt that extra-curricular general professional studies enhance the value of the extension school texts by clearly showing the student's distant objectives. In the 621st's bid for national honors, the officers believe that this parallel activity is equally responsible for their showing.

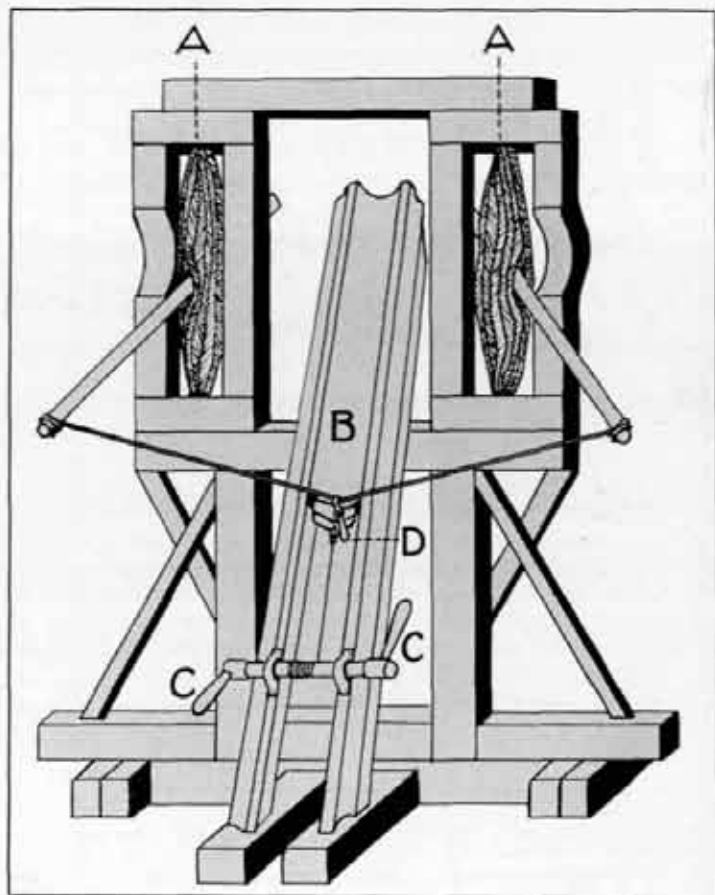
The regimental coat of arms pictured here, symbolizes the Delaware origin of the regiment, and the tradition the 621st carries on. The colors—blue and buff—are those of the State of Delaware. The three crowned cocks with mural crowns, refer to the three Delaware counties of New Castle, Kent and Sussex, as well as to the three forts defending Delaware soil; Forts Delaware, Du Pont, and Salisbury. The gamecocks themselves represent the fighting fowl of Blue Spanish strain carried into the field by Captain Jonathan Caldwell of Haslet's Regiment of the Continental Line. Captain Caldwell's command, known as the “Blue Hen's Chicks” soon found its nickname extended not only to the entire regiment, but also to all Continental troops raised in Delaware. The continuance of the nickname and of the Blue gamecocks as a symbol for a regiment of Organized Reserves from Delaware is most appropriate; as is the motto, which translated reads “We strike, and we destroy.”



SPECIAL CLASS, COAST ARTILLERY SCHOOL, 1939-1940

Standing, left to right: Captain Cameron, Lieutenants Griffin, Knox, Holton, Sims, Zofchak, Fowles, Sadler, Smith, White, Wilson, Stephenson, Mentzinger.

Seated, left to right: Captains Wrigley, Johnson, Bray, Isaachsen, Carey, Smith, Unruh, Dwinell, Wallace, Dalrymple, Southworth, Hastings, Orr, Strong, Snyder.



The Story of Artillery Through the Ages

During the republic and early empire, the Roman army had three distinct types of artillery, of which the ballista was the light stone thrower.

This was a larger and more costly machine than the catapult (chapter 4, of this series). As was the case with all the earlier Roman engines, it operated on the torsion principle. The Romans preferred twisted skeins to the tension, or "bow" system, as their bow wood was none of the best and was easily softened by rain. It is interesting to note that even the Roman infantry preferred slingers to archers. Not until after Constantine did armorers learn to give steel enough flexibility to be used in bows, and only then did the tension idea find favor in the Roman forces.

The "caliber" of torsion engines was governed by the size and strength of the twisted skeins (A, in the sketch); the stronger the skein, the larger the frame had to be. Caliber is most conveniently expressed by the weight of the missile in pounds.

The functioning of the ballista resembles that of the catapult with certain important differences. Unlike the catapult, the trough (B) was not adjustable for elevation, but was fixed at an angle of forty-five degrees. There was no pivot on the mount to give traverse. Changes in elevation were accomplished by use of blocks, and it was necessary to turn the whole machine to engage new targets.

The "bowstring" was much thicker than in the catapult. The machine was cocked by the reel at (C) and the trigger (D) was struck with a hammer to "fire" the piece. This trigger released the bowstring from the trigger-block, to which it had been engaged for cocking. This firing arrangement eliminated the considerable friction which would have been caused had the piece been fired by merely releasing the reel-handles.

The ballista was intended for use against field works, and, of course, was employed in siege operations. It was not so heavy as to be altogether immobile on the battlefield. On the march it could be carried in a wagon.

The engine was manufactured in many sizes, throwing missiles ranging in weight from five to ninety pounds. The caliber which found greatest popularity with the legions was the 14-pounder.

The ballista's range varied from 300 yards (for the 90-pounder), to 510 yards for the 5-pounder.

When Caesar invested Pompey's lines at Dyrrhachium (now Durazzo) his legionaries captured an important height that overlooked the town. These men were veterans of Caesar's Gallic war, not accustomed to surrendering ground to anyone. But when they came under a heavy concentration of Pompey's ballistae and catapults, they were driven from their position even though the range was in excess of 400 yards.

The United States Coast Artillery Association



The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of matériel and methods of training and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves, and Reserve Officers' Training Corps.

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The Coast Artillery Journal

MAJOR AARON BRADSHAW, JR., Editor

The JOURNAL prints articles on subjects of professional and general interest to officers of all the components of the Coast Artillery Corps in order to stimulate thought and provoke discussion. However, opinions expressed and conclusions drawn in articles are in no sense official. They do not reflect the opinions or conclusions of the Chief of Coast Artillery or any other official or branch of the War Department.

The JOURNAL does not carry paid advertising. The JOURNAL pays for original articles upon publication. Manuscripts should be addressed to the Editor. The JOURNAL is not responsible for manuscripts unaccompanied by return postage.

The Season's Greetings



To Coast Artillerymen
of all components
I extend hearty greetings
and best wishes
for a Merry Christmas
and a Happy New Year

A. H. Sunderland
Major General
Chief of Coast Artillery

The Air War Enigma

"In war, the abnormal is normal and . . . uncertainty is certain." *Infantry in Battle* tells us in its very first pages that the unexpected is to be expected; that in war, obscurity is the rule. The conduct and progress of the present European war confirms these axioms.

Those who felt that within a few days—perhaps within a few hours—after the outbreak of war, tremendous air attacks would have been launched and that the antiaircraft artillery would have been put to the test, are not alone in their bewilderment at the course of events to date. Indeed, it seems incredible that few if any well authenticated reports of antiaircraft success or failure have been received.

With a pardonable eagerness we have searched our morning papers for information as to what altitude the planes came in to the attack, how well the heavy or the newer intermediate caliber guns performed, how well the information services have functioned, what night attacks have been made, or how dive bombing tactics have been countered.

With no battles involving large masses of infantry and artillery to date—except of course in Poland where the Germans attained an immediate and real air superiority—we are still unable to judge how well the divisions, corps or armies have been protected by their mobile antiaircraft units.

But in spite of the obscurity and uncertainty, we can be sure that highly trained antiaircraft artillery, well equipped and of fine morale, will render a creditable account of

itself. But this calls for a high state of training. The following analogy may make this point clearer.

Shown a beautiful set of matched golf irons, the prospective customer is told that they are the exact duplicates of a set used by a well-known pro. With an eager smile of expectation, the dub golfer signs a chit for \$87.50, hurries out to his country club for his weekly round—and turns in a snappy 109, five strokes more than his score of the week before.

In the rotogravure sections of the Sunday papers we see pictures of fine looking AA equipment of this or that country, but we have no assurance that the real capabilities of the weapons will be attained in war if we are not certain that those who man them are really well trained.

This issue of your JOURNAL gives you an interesting slant on the organization of the German AA artillery. As time goes on, it will be of great interest to learn just how well the Flak batteries of the German Air Force, the corresponding units of the great French Army, and the British Territorials perhaps defending London, were really trained; how well their training progressed as the war went on. Can battalions manning rear area defenses who have for months not even seen an enemy airplane be maintained in a high state of training; can they be exchanged from time to time with the more active units?

The answers to these and other questions should be sought by every American artilleryman.

1 1 1

Election of Officers

The terms of office of the Vice President and four members of the Executive Committee expire on December 31, 1939. Their successors are to be elected by ballot from among Coast Artillery officers. The present members whose terms of office expire are:

VICE PRESIDENT

Colonel Avery J. Cooper, C.A.C.

MEMBERS OF THE EXECUTIVE COUNCIL

Colonel E. C. Webster, R.I. N.G.

Colonel E. W. Thomson, CA-Res.

Lt. Col. R. M. Perkins, CAC.

Lt. Col. J. P. Hogan, CAC.

To fill the vacancies the President of the Association appointed a nominating committee to place the names of competent officers in nomination. The committee is somewhat restricted in its selections (even though there are many qualified officers) because of the desire to have as many members of the Executive Council as possible available for meetings in Washington. In order to have a quorum, which is essential for the conduct of business, at least five members of the Executive Council should reside in Washington or be available for meetings there. The nominating committee has submitted the names of the following officers for consideration:

FOR VICE PRESIDENT

Brigadier General William Ottmann, N.Y. N.G.

FOR MEMBERS OF THE EXECUTIVE COUNCIL

Colonel F. S. Clark, C.A.C.

Colonel Charles Gleim, N.Y. N.G.

Colonel Robert S. Allyn, CA-Res.

Colonel David P. Hardy, Calif. N.G.

Colonel George J. Schulz, Del. N.G.

Colonel Charles C. Curtis, Pa. N.G.

Colonel Edward A. Evans, CA-Res.

Lieutenant Colonel Russell Y. Moore, Conn. N.G.

Lieutenant Colonel Charles I. Clark, CA-Res.

Lieutenant Colonel Kenneth Blood, C.A.C.

Lieutenant Colonel Harold F. Loomis, C.A.C.

Lieutenant Colonel Dale D. Hinman, C.A.C.

Major Arthur V. Winton, C.A.C.

It is especially desired to impress upon all members of the Association that they are not required to accept the selections of the nominating committee and that they are free to make substitutions and to vote for any officer of their choice. If any member does not approve of the committee's recommendation he should enter his personal choice on the ballot in the space provided for that purpose.

Printed ballots will be distributed about December 1, 1939. Normally, they will not be sent to individuals, as this has been found to be impractical, but they will be sent through regimental and post commanders, National Guard instructors, instructors of the Organized Reserves and similar agencies. It is urgently requested that individuals accomplish the ballots and return them to the agency from which they received them, and that these agencies forward them promptly to the Secretary of the Association. In case a member of the Association should fail to receive a printed ballot it is requested that he record his vote informally. A copy of the printed ballot, which will be mailed out, appears on page 573. Ballots should be mailed in time to reach the Secretary of the Association prior to January 4, 1940. They cannot be counted if received after that date.

In expressing at this time our appreciation to the retiring members of the Executive Council, we are mindful of the sacrifices made by them to further the work of the Association. Their helpful suggestions affecting policies, and their willingness at all times to render every possible assistance, has to a high degree contributed to whatever success and progress the Association and the JOURNAL have attained.

1 1 1

The Individual Trophy

In addition to the announcement of the winner of the Army Extension Course regimental trophy carried elsewhere in this issue, the JOURNAL is also able to declare the names of the winners of the nine individual trophies. Nine sabers awarded by the Coast Artillery Association go to Reserve officers of our arm in the grade of captain or lieutenant who have done most to promote the training (active and inactive) and *esprit* within the regiments that made the highest percentage in each corps area.

An award goes to one officer in each of the nine corps areas. Here is a brief outline of the plan under which the winners were determined:

INDIVIDUAL TROPHIES

An officer's saber is presented each year to a Regular Army or Reserve regiment in each corps area, under the following conditions:

a. The regiment's average Coast Artillery Reserve officer strength on the last day of December and June must be thirty or over.

b. The number of Coast Artillery Reserve officers in the regiment who have earned twenty-five hours or more of credit while member of the regiment as evidenced by completed subcourse certificates or satisfactorily completed command and general staff lessons between July 1st and June 30th, will be divided by the regimental strength as determined in paragraph a above and the result expressed as a percentage.

c. The regiment with the highest percentage will receive the saber.

d. The saber will be awarded to the Coast Artillery Reserve officer of the regiment in the grade of second lieutenant, first lieutenant, or captain who has done most to promote the active duty and inactive duty training and the *esprit* of the regiment, during the year.

e. The officer will be selected by a committee composed of the field officers and the Unit Instructor of the regiment.

The winning regiment in each corps area and the officer selected by a committee of field officers and the unit instructor are:

FIRST CORPS AREA

606th C.A. (TD) Captain Raymond C. Woodes, Haverhill, Massachusetts.

SECOND CORPS AREA

621st C.A. (HD) First Lieutenant William B. Smith, Richardson Park, Delaware.

THIRD CORPS AREA

523d C.A. (AA) Captain Edward J. Carey, Oakmont, Pennsylvania.

FOURTH CORPS AREA

545th C.A. (AA) First Lieutenant Edwin H. Whitaker, Jr., Laurel Mississippi.

FIFTH CORPS AREA

535th C.A. (AA) Captain Harold B. Carter, Fort Wayne, Indiana.

SIXTH CORPS AREA

526th C. A. (AA) First Lieutenant Loren W. Jenkins, Escanaba, Michigan.

SEVENTH CORPS AREA

507th C.A. (AA) Captain Rolland W. Stoebe, Saint Paul, Minnesota.

EIGHTH CORPS AREA

69th C.A. (AA) Captain E. J. Barnett, Houston, Texas.

NINTH CORPS AREA

976th C.A. (AA) First Lieutenant Harold E. Friddle, Coronado, California.

In addition to the saber engraved with his name, each winning officer also received a commendatory letter from the Chief of Coast Artillery, Major General A. H. Sunderland.

/ / /

National Guard Trophy

The Executive Council of the United States Coast Artillery Association, upon the advice and with the consent of the Chief of Coast Artillery and President of the Association, appointed a board of officers to study the present basis of selection for the Regimental National Guard Trophy. Objections have been voiced to the trophy being presented for general efficiency, since the weight given to target practice eliminated from the competition any organization which did not fire. The belief was held in some quarters that this method of selection reflected adversely on the organizations who could not fire, even though this condition in most instances was beyond their power to correct.

The board holds the opinion that there is no equitable basis upon which to rate military efficiency other than target practice. They therefore recommend that the trophy be awarded solely on the results of target practice but that it be designated as an award for efficiency in target practice instead of "general efficiency." They recommend that the procedure for determining the award be as follows:

1. No regiment which has not been rated satisfactory at both the annual armory inspection and the field inspection will be eligible to compete.
2. No regiment containing less than four firing batteries will be eligible for the competition.
3. The following values will be given each battery of a regiment in accordance with the battery classification recommended by the Coast Artillery Board and approved by the Chief, National Guard Bureau: Excellent—5; Very good—4; Good—3; Fair—2; Unclassified—1; No practice—0.
4. In computing the total score of each regiment, appropriate numerical factors will be introduced so that all regiments will be equitably compared regardless of the number of batteries in the organization.

The procedure drafted by the board to govern the selection for award of the trophy, has been concurred in by the Chief of the National Guard Bureau and has been approved by the Chief of Coast Artillery, the President, and the Executive Council, United States Coast Artillery Association. Therefore this procedure will govern future awards.

The Prize Essay Competition

In our next number we expect to be able to tell you the names of the winners in the 1939 Prize Essay Competition. At the moment the judges are reading the essays submitted and will shortly make known the results of their deliberations.

The winning contestants will be notified by telegram as soon as the judges come to a decision. The first prize carries an award of \$200.00 and any essays that receive an honorable mention rating will win \$100 for the writers.

A large number of essays were received for 1939, thus repeating the success of the 1938 competition. For 1940 we expect an even larger number of entries. All this is by way of leading up to the suggestion that if you intend to enter the 1940 contest, *now* is the time to get on the job. A description of the rules governing the contest appears in an advertisement elsewhere in this number.

There is no restriction on your choice of subject other than that the essay must be appropriate for a Coast Artillery audience—a field that is wide enough to include almost anything in the military scene. The subjects listed below are suggested merely as a starting point in the event you do not readily have one in mind.

We cannot too strongly point out that it is not at all necessary for a contestant to be a finished writer, although clarity of expression is a factor considered when judging essays. If your essay makes a material contribution to military thought, it will win over one that doesn't, even though the latter be couched in the most elegant of English. In other words we want the field soldiers in on this.

Why not try your hand at it?

LIST OF SUGGESTED SUBJECTS

The rôle, organization, and training of AA artillery with a view to its employment with a field army.

AA intelligence service.

Aircraft warning service.

A system of beach defense.

Training methods for National Guard, Organized Reserves, and R.O.T.C.

Coast Artillery gunnery of today and the problems of long-range and indirect fire.

The value of mines in harbor defense.

National Guard organization and the best means of maintaining efficient Coast Artillery National Guard regiments.

The mission of the Coast Artillery Organized Reserve in the event of an emergency, including its mobilization and assignment to station.

Tactical employment of railway artillery when operating with an army in the field.

On the assumption that a harbor of major importance is to be fortified, what would constitute an ideal defense?

The antiaircraft regiment: a discussion of an ideal organization and ideal armament, including guns, ammunition, and fire control equipment.

Ballot for Annual Election of Officers

INSTRUCTIONS AND INFORMATION

1. The ballot below is the slate prepared by a nominating committee to replace those members whose terms of office expire on December 31, 1939.

2. Record your vote by making an "X" in the appropriate square or indicate your choice by writing in the name of your candidate. Ballots received with signature, but without individual votes recorded, will be considered proxies.

3. No member is to be deprived of a voice in the nomination and selection of the new members of the Council. If you do not approve of the Committee's choice, enter your personal choice in the space provided.

4. Ballots received after January 4, 1940, will not be counted.

5. If residing on a military post, please hand your ballot to the Adjutant to be forwarded together with all other ballots collected on the post. Members of National Guard and Organized Reserve Regiments should turn in their ballots to their regimental headquarters to be forwarded at one time. Those members for whom the foregoing instructions are not applicable should mail their ballots to The Secretary, U. S. Coast Artillery Association, 1115 17th St., N.W., Washington, D. C.

THE U. S. COAST ARTILLERY ASSOCIATION BALLOT

FOR VICE PRESIDENT

☐ Brig. Gen. William Ottmann, N.Y. N.G.

FOR MEMBERS OF THE EXECUTIVE COUNCIL (1940-41)

Please vote for four *only*; two regular army, one national guard and one reserve officer

- ☐ Colonel F. S. Clark, C.A.C.
- ☐ Colonel Charles Gleim, N.Y. N.G.
- ☐ Colonel Robert S. Allyn, CA-Res.
- ☐ Colonel David P. Hardy, Calif. N.G.
- ☐ Colonel George J. Schulz, Del. N.G.
- ☐ Colonel Charles C. Curris, Pa. N.G.
- ☐ Colonel Edward A. Evans, CA-Res.
- ☐ Lt. Col. Russell Y. Moore, Conn. N.G.
- ☐ Lt. Col. Charles I. Clark, CA-Res.
- ☐ Lt. Col. Kenneth Blood, C.A.C.
- ☐ Lt. Col. Harold F. Loomis, C.A.C.
- ☐ Lt. Col. Dale D. Hinman, C.A.C.
- ☐ Major Arthur V. Winton, C.A.C.

Fill in names of other candidates you desire to vote for in lieu of those above.

☐
☐

Signature

Rank and Organization

Address

Coast Artillery target practice: its purpose and how best to accomplish it.

The ideal types of weapons for seacoast defense.

The rôle of the NCO and how to prepare men to fill it.

1 1 1

Britain's New Battleships

Although some details of the new British battleships under construction have now been officially released, together with photographs and a drawing by an eminent naval artist, it is not generally realized what a tremendous revolution in capital ship design they represent, nor how many novel features are embodied in their construction.

The *King George V* and her four sister ships, the *Prince of Wales*, the *Duke of York*, the *Jellicoe*, and the *Beatty*, will have a displacement of 35,000 tons, and will thus be the largest battleships ever built in this country, since the *Hood*, with a displacement of 42,100 tons, is rated as a battle-cruiser.

Their main armament will consist of ten 14-inch guns disposed in one quadruple turret forward with a twin turret superimposed and one quadruple turret aft. They will also carry sixteen 5.25-inch dual-purpose guns in eight twin turrets—four abreast the two masts and four superimposed abreast the two funnels, and, according to the drawing published in February, four multiple pom-poms—one mounted forward on the twin turret, one on the after turret and two abreast the fore funnel, and four multiple machine guns—two abreast the mainmast and two abreast the foremast.

It has been officially stated that their design will include enhanced defence against air attack, including an improved distribution of deck and side armour and more elaborate subdivision. Particular attention has also been given in their construction to protection against gunfire, torpedoes, and mines. Unofficial reports give their total weight of armour as over 14,000 tons each and their water-line thickness as 16 inches.

Their propelling machinery will consist of oil-fired Admiralty three-drum type boilers and Parsons geared turbines of 130,000 s.h.p., which are expected to give a speed of over thirty knots. They will be equipped with several aircraft accommodated in hangars and flown off by means of a fixed, sunken athwartship catapult, of a new type, amidships.

The *King George V* class are the first British battleships to be designed to carry aircraft, for those in existing capital ships are additions to their original equipment. And they are the first battleships to be designed with a hangar in which to stow them and a catapult to launch them into flight. Hangars were erected only recently in a few of our modernized capital ships, and those of the other capital ships with catapults were so equipped only during the last ten years or so.

They are also the first British battleships—in fact, the first British warships of any kind—to mount guns in quadruple turrets. The battleships *Nelson* and *Rodney* carry their main armament guns in triple turrets, and all

the previous capital ships carried their primary guns in twin or single turrets. The first cruisers to carry more than two guns in one turret were the recently built *Southampton* class.

The *King George V* class, again, are the first British battleships to be designed without a torpedo armament. But the torpedo tubes are being removed from our older battleships, as well as from our heavy cruisers, as they come up for refit. While the torpedo is still regarded as a most potent weapon when employed by small craft, it is considered to be a useless encumbrance in warships above the light-cruiser category.

Both the primary and secondary guns of the *King George V* class are of a calibre new to the Royal Navy. The latter are dual-purpose weapons, being equally effective against surface or aerial targets, and this is the first time that guns of the type have been mounted in a British capital ship.

The new battleships differ from the capital ships of similar displacement now being built by the United States, France, Italy, and Germany in that they mount 14-inch main armament guns instead of 15-inch or 16-inch guns. The 14-inch weapon fires a shell weighing 1,560 pounds, while the 15-inch gun fires a projectile weighing 1,920 pounds, and the 16-inch gun discharges a projectile scaling 2,461 pounds.

This selection of weapons of smaller calibre was made deliberately, however. It was considered that the Treaty limit of 35,000 tons displacement would not permit the mounting of an adequate number of larger-calibre weapons unless some measure of protection, speed, seaworthiness, range, or some other essential quality were sacrificed. And the 14-inch gun is capable of a more rapid fire than the 15-inch or 16-inch gun, to which it is equal in effective range, and will thus straddle the target more quickly.

The *King George V* class will be the first British capital ships to be armed exclusively with all-steel guns, as distinct from the wire-wound guns which form the main armament of all previous vessels of this type. They have been manufactured on the built-up principle, known as the auto-frettage system. The new method consists in building up the gun by sweating steel tubes over the inner tube.

It was formerly the practice to wind steel wire over the initial tube before fitting the outer sleeves. Wire guns were considered safer because, in the event of a burst, the explosion was localized by the wire wrapping. These guns, however, were much heavier than the new all-steel type. The latter pattern is regarded as perfectly safe owing to the improved quality of the steel now used.

To meet the demand for very long-range firing, which entails the highest velocities, modern naval guns must be of great length. This can be as much as fifty-five calibres, or fifty-five times the diameter of the bore. Such length calls for unusual longitudinal strength, and deficiency in which would tend to make the gun droop and seriously impair its accuracy.

The required degree of longitudinal strength is pro-

vided by the auto-frettage system. Nearly all the guns now being manufactured for the Royal Navy are of the auto-frettage type. Britain was the last naval Power to adopt the all-steel gun, but the delay was considered to be justified because of the British Navy's comparative immunity from gun explosions.

Perhaps the most important quality of the guns of the *King George V* class battleships, however, is their penetrative power. It was announced recently that the effective range of our new 14-inch armour-piercing shells, as measured by the perforation of any given thickness of armour, considerably exceeds that of 15-inch shells, in spite of their smaller caliber.

Britain, therefore, has the advantage of the saving in weight effected by mounting 14-inch weapons instead of 15-inch guns, as well as a better gun. The weight thus saved has been devoted to other purposes, mainly to increased protection. This revelation is a crushing reply to the criticism directed against the adoption of the 14-inch gun for the first five of our new battleships.

The *King George V* was launched on 21st February and the *Prince of Wales* took the water on 3d May. The *Duke of York* left the stocks in September, and the *Beatty* will be launched in November, while the *Jellicoe* will reach the "christening" stage early in the new year. All five of these huge battleships will be in commission in two years' time.—*The Fighting Forces*.

* * *

The Russian Navy's Strength

The Russian Navy continues to shroud itself in mystery, which is a good thing for its reputation abroad, since the less that is known about a military or naval force the more it is respected. However, we know on reasonably reliable authority that much progress has been made with respect to renovation of the navy, which until a few years ago had remained the same as at the close of the last war. Numerous articles inspired or edited by important officials acclaim the new-born force of this fleet which, they say, has already returned to the level of its competitors and is perfectly capable henceforth to safeguard all of Russia's maritime frontiers.

At about this time last year, we called attention in this journal to the conferences arranged by the government of the Soviet Union with the United States for the construction of heavy battleships. The negotiations were not successful, at least in their original purpose, but we know today that the construction of a 35,000-ton battleship, which we are told is to be named the *Third Internationale*, was begun last year in a Russian yard, probably on American plans. Its principal armament, like that of the ships of same tonnage under construction in the United States, is reported to consist of nine 16-inch guns. A second vessel of the same type is said to be begun or about to be begun.

If the plans for these battleships come from America, it is to Italy that Russia is indebted for plans for her new cruisers. In fact it seems that it was Italian engineers who supervised the enlarging of Soviet yards to permit con-

struction of heavy vessels. This journal (*Le Yacht*) announced last year the commissioning of the 7,800-ton cruiser *Kirow*, with nine 180-mm. guns, four 102-mm. AA guns, and two 533-mm. triple torpedo tubes. This ship powered with 100,000-hp. steam turbines burns fuel oil and has attained a speed of thirty-eight knots—for cruising speeds up to seventeen knots, Diesel engines have been installed. It carries a catapult and four hydroplanes. Another similar cruiser, the *Gorky*, has begun trials and two others the *Kribichev* and the *Orjonikize*, are under construction. It is the building of these vessels, more heavily armed than the light cruisers carrying only 6-inch guns, which gave Germany a pretext for increasing the number of its first-class cruisers armed with 8-inch guns.

The flotilla-leader *Tashkent*, built by the Odero yards at Livorno, was commissioned after trials in which it attained a speed of forty-four knots, according to the Italian press. This 2,800-ton vessel has six 5.1-inch guns and nine torpedo tubes. Another of a similar type, the *Moskwa*, built at Nikolaiew, has been incorporated in the Black Sea Fleet. According to information from unofficial sources, the Baltic yards are building a series of nine 2,600 ton destroyers on Italian plans; three are said to be already commissioned and the six others nearing completion.

The status of Russian submarine construction remains a complete mystery. The *Revue Maritime*, at the end of last year, estimated their number at 150, including those being built. According to the German *Taschenbuch der Kriegsschiffe* for 1939, there are 160, including seventy-two operating in the Baltic Sea and the Arctic Ocean, thirty in the Black Sea, and fifty-eight in the Far East. Recently the Minister of the Japanese Navy said only that there are more than 100. The People's Vice-Commissar of the Navy contented himself with affirming that the Russian submarine fleet is the largest in the world. We know that a large part of this fleet—some say half—is composed of small submarines of 150 to 200 tons useful only for coastal defense, but there are also some of 1,000 or 1,100 tons with larger cruising range.

The Russian Navy continues to show keen interest in the arctic waters. It has undertaken the construction of an entire fleet of icebreakers, several being assigned to the northern maritime route which is kept open, when practical, between Murmansk and Vladivostok. It has begun a base on the northern coast of the Sea of Okhotsk, which it proposes to use as a point of departure for submarines and privateers in order to avoid the straits of the Sea of Japan where interception would be easy in case of war. It is true that this sea is bordered by the Kurile Island chain which belongs to Japan, but there are numerous very deep channels, most of which are free of ice at all times and which it would be practically impossible to close entirely. One handicap is that the principal port of this coast, Nogaev, is 1,700 miles from Yokohama, an operating distance which would require submarines of large cruising radius.—*U. S. Naval Institute Proceedings* from *Le Yacht*.

Coast Artillery Board Notes

Any individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to problems under study by the Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

THE COAST ARTILLERY BOARD

COLONEL WILLIAM S. BOWEN, C.A.C., *President*
LT. COLONEL GORDON B. WELCH, Ordnance Dept.
MAJOR FRANKLIN E. EDGEComb, C.A.C.
MAJOR HUGH N. HERRICK, C.A.C.

CAPTAIN ROBERT W. CRICHLow, JR., C.A.C.
CAPTAIN ROBERT H. KREUTER, C.A.C.
CAPTAIN CORTLANDT VAN R. SCHUYLER, C.A.C.
CAPTAIN CHARLES E. SHEPHERD, C.A.C.

CORDLESS SWITCHBOARD (PROJECT No. 1159). A switchboard of this type recently tested by the Board is intended for local routine telephone switching in plotting rooms, battery and other command stations, and by searchlight officers, in harbor defenses. The need for such a switching device has been particularly apparent in the case of long range fixed batteries. These batteries commonly have as many as eight observing and spotting stations several of which may be employed during action against a naval target. The fire control switchboard, BD-74, is not adapted to the type of switching required for frequent and prompt changes in plotting or spotting base lines. Means under the direct control of the battery commander or the range officer for making such changes have been found essential. Furthermore, it is sometimes desirable to set up nets whereby selected observers may be connected continuously by telephone to a commander, or various searchlights to the searchlight officer. The present standard switchkey sets have insufficient line capacity and do not provide the necessary number of separate connecting circuits for the purposes outlined. Field type switchboards, such as the BD-11, have been utilized on occasion but these have not been considered entirely suitable for use in fixed installations.

The cordless switchboard tested (see Figure 1) is an adaptation of a PBX switchboard in commercial production for use in factories, large offices, and in other locations where private intercommunication systems are installed. The commercial device includes trunks for connecting local telephones to a main exchange, and also means for powering the local telephones. These features are omitted from the model tested, it being the intention to route all lines to it through the fire control switchboard, BD-74, for switching other than routine, and for powering the lines. The cordless switchboard is arranged for "dry" switching, with condensers in each line to prevent direct current from reaching the board.

The model tested is wired for twenty lines. These lines may be switched to put the telephones in any of five separate connecting circuits. Switching is by double-throw cam keys of which three are provided for each line. (The down position of one key is for ringing.) The operator's telephone, EE-71 or other standard type, may be included in any connecting circuit by throwing a key. Each line has a relay controlled lamp actuated by the telephone ringer, and each connecting circuit is provided with a lamp to indicate a ring from a telephone connected in the circuit. Ringing out is accomplished by holding down the ringing key corresponding to the desired line and operating the ringer of the operator's telephone. Accessories include a night alarm bell with switch, and testing jacks by means of which each line may be tested without going through the circuits in the switchboard. The outside dimensions of the switchboard are twenty-three by fourteen by fourteen inches. The front panel is hinged to drop forward, and the top, sides and back are removable in one piece to provide access to the interior.

Tests of the switchboard included establishing a communication system comprising thirteen telephone lines connected to the board. With these lines the following representative combinations were set up, in turn:

Nine searchlights and four group command posts.
Battery command post and eight observers.

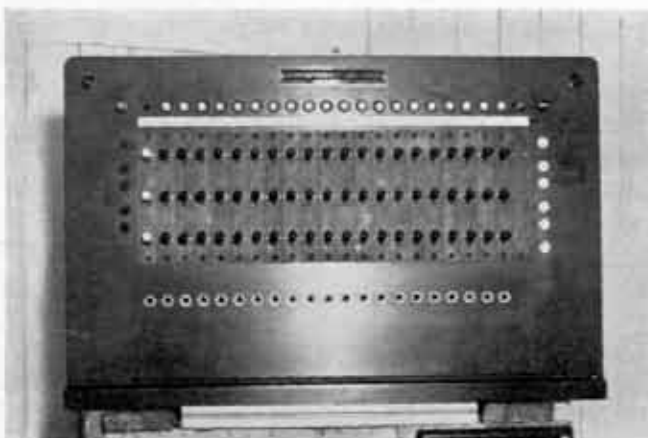


Figure 1: Cordless switchboard

Four readers, four spotters, two armsetters and two spotting board operators.

The board was found to permit rapid switching, of types such as the following, with satisfactory communication in each case:

All lines in one connecting circuit including the operator's telephone.

One or more searchlights connected to each of four group command posts.

Battery commander connected to several observers, simultaneously, and in turn.

Each of four readers connected in turn with one or the other of two armsetters, and similarly with spotters and spotting board armsetters.

Subsequent to the tests described above, the switchboard was installed in the C station at Fort Monroe, where it was used successfully in harbor defense searchlight drills.

The cordless switchboard was found particularly advantageous for switching by other than a regularly assigned operator. Its use in a command station would enable the commander to give or receive instructions in person over any line connected to the board by a simple manipulation of keys. The communication set-up in use at any time is readily seen from an inspection of the front panel of the board.

The 20-line switchboard has suitable capacity for use with the large majority of long range batteries. The board employed in the plotting room of a battery having eight observers and spotting stations would utilize a minimum of twenty lines; viz., eight readers, eight spotters, two plotting board armsetters and two spotting board armsetters. Four additional telephones could be accommodated by connecting each armsetter directly to a bus corresponding to a connecting circuit. It will be seen that switching readers and spotters to armsetters occupies four of the five connecting circuits provided by the board. By modifications which it is thought can be made readily, busses corresponding to one or more connecting circuits could be "broken," when desired, thus providing additional connecting circuits.

A switchboard of 20-line capacity can be used to advantage in BC stations of long range batteries, in command stations of groups including more than three batteries, and in command stations of antiaircraft groups in harbor defenses. The antiaircraft groups usually require telephone communication to several observing posts in addition to the fire units. The 20-line board is thought generally suitable also for use by searchlight officers. A board of 12-line capacity would suffice for many group and higher command stations.

Adoption of the cordless switchboard, with minor modifications, for use in harbor defenses, is contemplated.

MODIFICATION OF DIRECTOR, M2. The Coast Artillery Board has recently tested a mechanism consisting of a flexible shaft extension for the present altitude spot dial and handwheel for the Director M2.



Figure 2: Director M-2

The photograph (Figure 2) shows the Director M2 with the mechanism attached. The mechanism consists of a flexible shaft seven feet long and one-half inch in over-all diameter terminated at one end by a hand-held gear box on which is mounted a present altitude spot dial three inches in diameter. The gear box and dial have an over-all diameter of four and five-eighths inches, and a depth of two and one-half inches. A handle in the form of a straight rod one inch in diameter and four inches long is cast in the center of the bottom of the gear box perpendicular to that surface. An operating handwheel similar to that used for the present altitude spot dial on the director is provided. By means of a special coupling arrangement at the other end of the flexible shaft it may be attached to the director in the place of the present altitude spot operating handwheel after the latter has been removed. By turning the operating handwheel on the hand-held gear box, corrections may be set into the director, and both the present altitude spot dial on the gear box and the regular present altitude spot dial on the director should indicate identical settings.

Provision of the flexible shaft extension for the present altitude spot dial and handwheel was expected to:

a. Relieve somewhat the crowding of operators around the Director M2.

b. Facilitate the setting of present altitude spots by placing the dial and adjusting knob in a location more easily accessible and where they were not obscured by an operator using the left spotting telescope.

For the Director M2, an observer using the left telescope stands directly in front of the present altitude spot dial, thus interfering with the range officer when setting altitude spots. Relocation of the handwheels and dials,

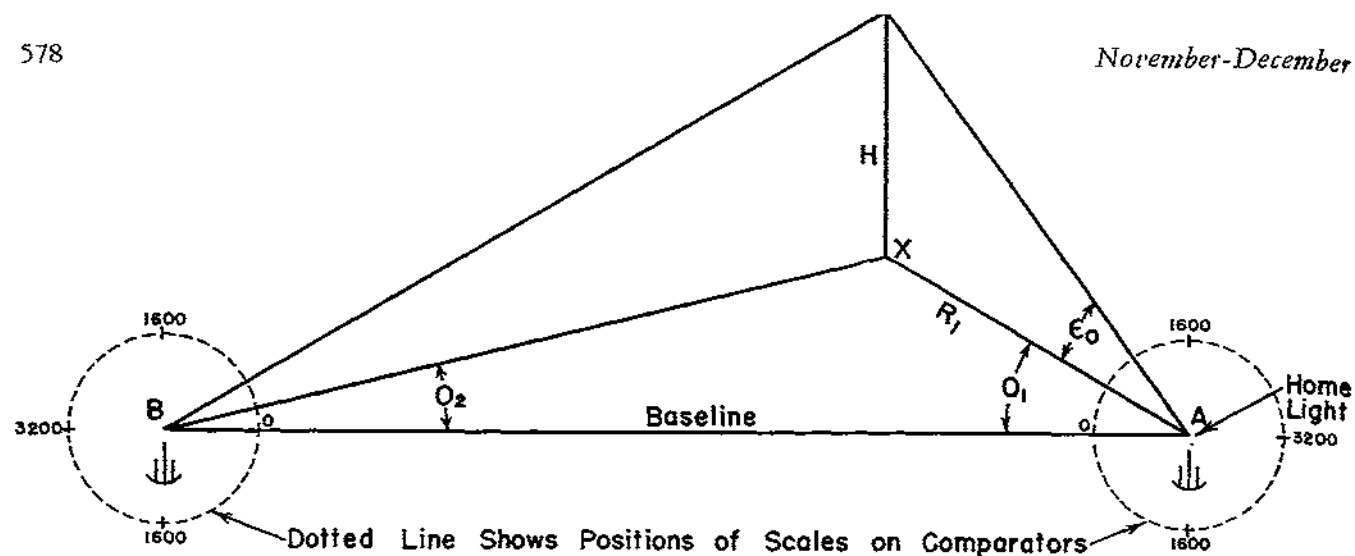


Figure 3

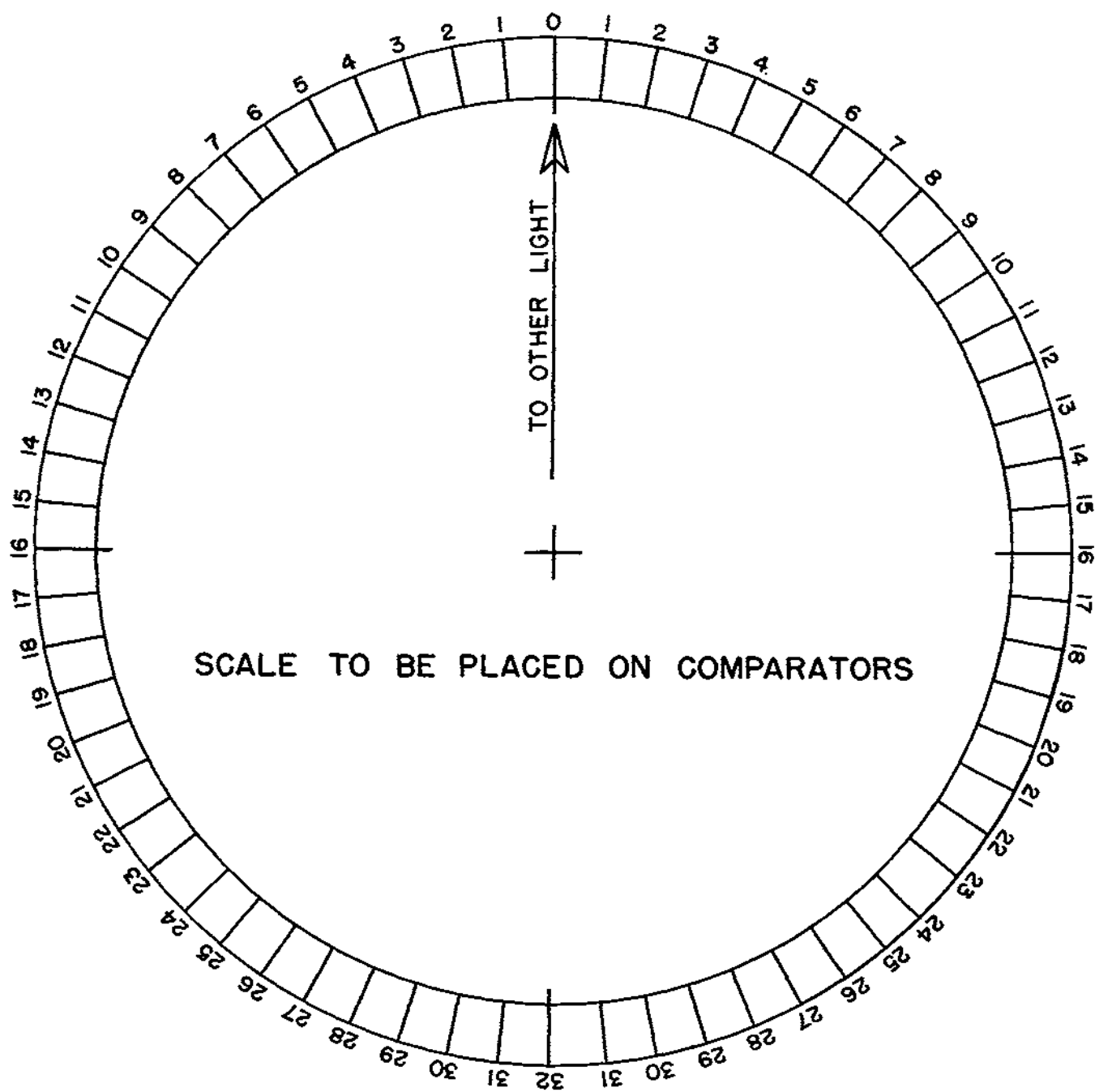


Figure 4

which was recommended as a remedy in the narrative report of one battery commander, was considered. The Coast Artillery Board was of the opinion that the operational difficulties described were not serious and recommended that no alteration or modification be undertaken. However, the device described above was suggested as a possible remedy for the congestion around the rear face of the director.

The subject mechanism was installed on a Director M2 at Fort Monroe. Adequate drills were conducted by personnel manning the director to insure familiarity with the extension device. About 55 rounds were fired by a two-gun battery using the director equipped with this mechanism. Present altitude spots were applied with sufficient frequency during drills and firing to afford an adequate test.

It was found that the flexible shaft cable could be attached to and detached from the director easily and quickly. Very little additional physical effort was required to operate the spotting handwheel because of the installation of the flexible shaft extension. However, in making a setting it was found necessary to allow for an elastic or spring effect in the flexible shaft. By moving the hand-held dial the proper distance beyond the setting actually desired, then permitting it to spring back of its own accord it would come to rest at the true spot setting. The advantage of being able to set present altitude spots by means of the flexible shaft extension mechanism, instead of by the usual method, seemed rather slight. However, certain disadvantageous features of the mechanism were brought out by the test as set forth below.

It was necessary for the operator, customarily the range officer, to hold the gear box in his hands while setting altitude spots since no means was provided to suspend the gear box in any other way. This made it difficult to use a slide rule or other computing device commonly employed by the range officer and limited his movements to the area within the length of the flexible shaft. The spot indicated on the dial of the gear box could be changed as much as twenty yards simply by moving the gear box about without holding the operating handwheel stationary. This change in the setting of the gear box dial resulted from normal bending of the flexible shaft incident to movement of the operator carrying the gear box. The dial setting on the director was unaffected by flexing of the extension shaft. In operating the mechanism, the setting shown by the director dial lagged behind that shown on the gear box dial by twenty yards. On the whole the extension device was found to be somewhat cumbersome, unwieldy and generally in the way of the director detail.

The personnel of the battery conducting the test and the Coast Artillery Board believed that, even though the disadvantages noted were eliminated, the added convenience afforded by a device of this nature would not justify the cost of the procurement and maintenance. Because of the limited demand from personnel of batteries equipped with the Director M2 for such a change in that

instrument, and the slight advantage accruing from use of the subject device in the current test, it appeared to the Coast Artillery Board that further action toward rearrangement of dials and controls on the Director M2 was inadvisable. It was therefore recommended that further test and development of the subject mechanism be dropped. The Chief of Coast Artillery has approved this recommendation.

A PROPOSED METHOD FOR THE DETERMINATION OF ALTITUDE FOR ACOUSTIC CORRECTORS, M1 AND M2. A paper on this subject, submitted to the President, Coast Artillery Board, by First Lieutenant Henry P. Van Ormer, CAC, has been studied by the Board and it is believed that the method proposed will interest Coast Artillery officers, especially those now serving with searchlight batteries.

With the sound locator equipment now in the hands of searchlight batteries, the altitude of the target is *estimated* by the chief of section and set into the acoustic corrector. The accuracy with which the altitude of an unseen airplane target can be estimated is questionable.

The determination of the altitude by the method used by Lieutenant Van Ormer requires the solution of one horizontal triangle and one vertical triangle. It utilizes the horizontal angles measured by two sound locators pointed at the sound source and the vertical angle (angular height) measured by one of these sound locators as shown in Figure 3. Telephone or radio communication between the two stations is required.

The horizontal angles O_1 and O_2 , Figure 3, are read from improvised scales, Figure 4, which are mounted on the faces of the two comparators. In the horizontal triangle, R_1 is solved for, using two angles and the included side (known length of base line between sound locators). In the vertical triangle, H is solved for, using R_1 and the angular height. The Crichlow Slide Rule is used to solve these triangles. The time required is about thirty seconds.

The procedure is as follows:

a. *Orientation of the improvised scales.* With the two searchlights in action, the beam of each light is directed in turn on the base of the beam of the other. While the lights are in this position, the zero of the improvised scale is matched with the searchlight azimuth pointer on each comparator and the scales are fastened in place. During this operation, and until the horizontal angles have been measured, the correction pointers on the acoustic corrector are kept at zero. It should be noted that these improvised scales cannot be used with the "zero reader" type of control station but in such cases the data can be obtained from the azimuth dial of the acoustic corrector.

b. *When a target has been picked up by the sound locators.* When the two sound locators have picked up a target and started to track, the command "Ready, Take" is given to both stations. At this command, the value of the horizontal angle from each station and the angular height from one station are read. With these values and

the base line length known, the solution for altitude with the Crichlow Slide Rule is a simple matter.

Lieutenant Van Ormer states that he has used this method successfully for determining altitude with searchlight units in Panama and at Fort Monroe.

An analysis of the method to determine the effect of sound lag on the accuracy of the solution discloses that:

a. When there is a large difference in the slant ranges from the two sound locator stations to the target, large errors in the determination of horizontal range may result. The effect of this horizontal range error on altitude increases as the angular height increases.

b. Where the altitude is 4,000 yards or less and the target is picked up by both sound locators at ranges greater than approximately 8,000 yards, in front of the base line rather than off to the flank, the sound lag difference is comparatively small. Under such a condition the accuracy of the method should satisfy the requirements of the problem.

c. In most instances, if the two altitudes are determined by solving the two vertical triangles, each containing the target and a station, the errors due to the condition set

forth in subparagraph a, above, will be in the opposite sense. By averaging the two altitudes thus obtained, a closer approach to the true altitude will result.

d. When the target travels directly toward one station, the accuracy of altitude determination, as computed from the position data pertaining to the other station, is not affected by the condition set forth in subparagraph a, above.

The Coast Artillery Board is of the opinion that:

a. The method of altitude determination proposed by Lieutenant Van Ormer is workable for searchlights, provided both sound locators can pick up the target at long range; that is, at such a point that the difference in the ranges from the two sound locators to the target is small compared to either range.

b. Under favorable conditions, it should give more accurate results than an estimation of the altitude.

c. The altitude can be obtained without interfering with the normal operation of the sound locator.

Where this method, or a method similar to it, is used in target practice, it is suggested that the method used be described and commented on in the narrative report.



AA GUN PLANT WORKS DAY AND NIGHT

The Royal Ordnance Factory at Nottingham, England, is working full blast to complete the defensive ring around the "Tight Little Island."

Coast Artillery Activities

OFFICE OF CHIEF OF COAST ARTILLERY

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL JOSEPH A. GREEN

Matériel and Finance Section
LIEUTENANT COLONEL H. B. HOLMES, JR.
MAJOR J. T. LEWIS
MAJOR S. L. MCCROSKEY

Plans and Projects Section
LIEUTENANT COLONEL A. G. STRONG
MAJOR L. L. DAVIS

Organization and Training Section
LIEUTENANT COLONEL D. D. HINMAN
MAJOR AARON BRADSHAW, JR.
CAPTAIN J. E. HARRIMAN

Personnel
LIEUTENANT COLONEL K. T. BLOOD



Notes from the Chief's Office

The present motor transportation procurement program contemplates *en bloc* replacement of all motor transportation, except prime movers, for the five existing Regular Army antiaircraft regiments in the United States. This program should be completed by the middle of the calendar year 1940.

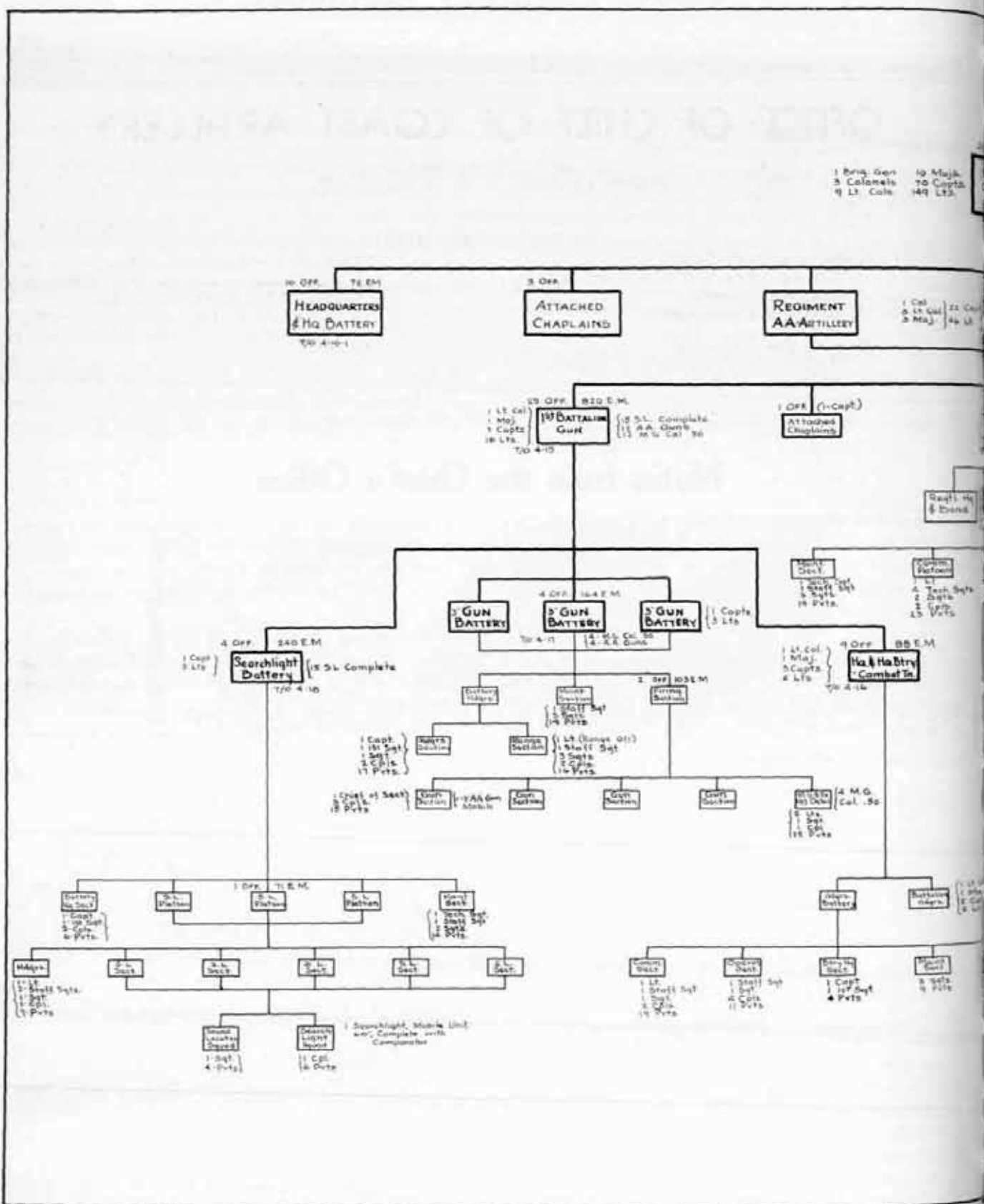
The issue of antiaircraft guns, directors, and antiaircraft B.C. instruments to Coast Artillery ROTC units has been approved by the Secretary of War. It is probable that

directors M1A1, M-2, and M-3 will be used to meet the major portion of the requirement for this issue. Delivery of this equipment may be delayed until the summer of 1940 due to the necessity for modernizing certain articles prior to issue.

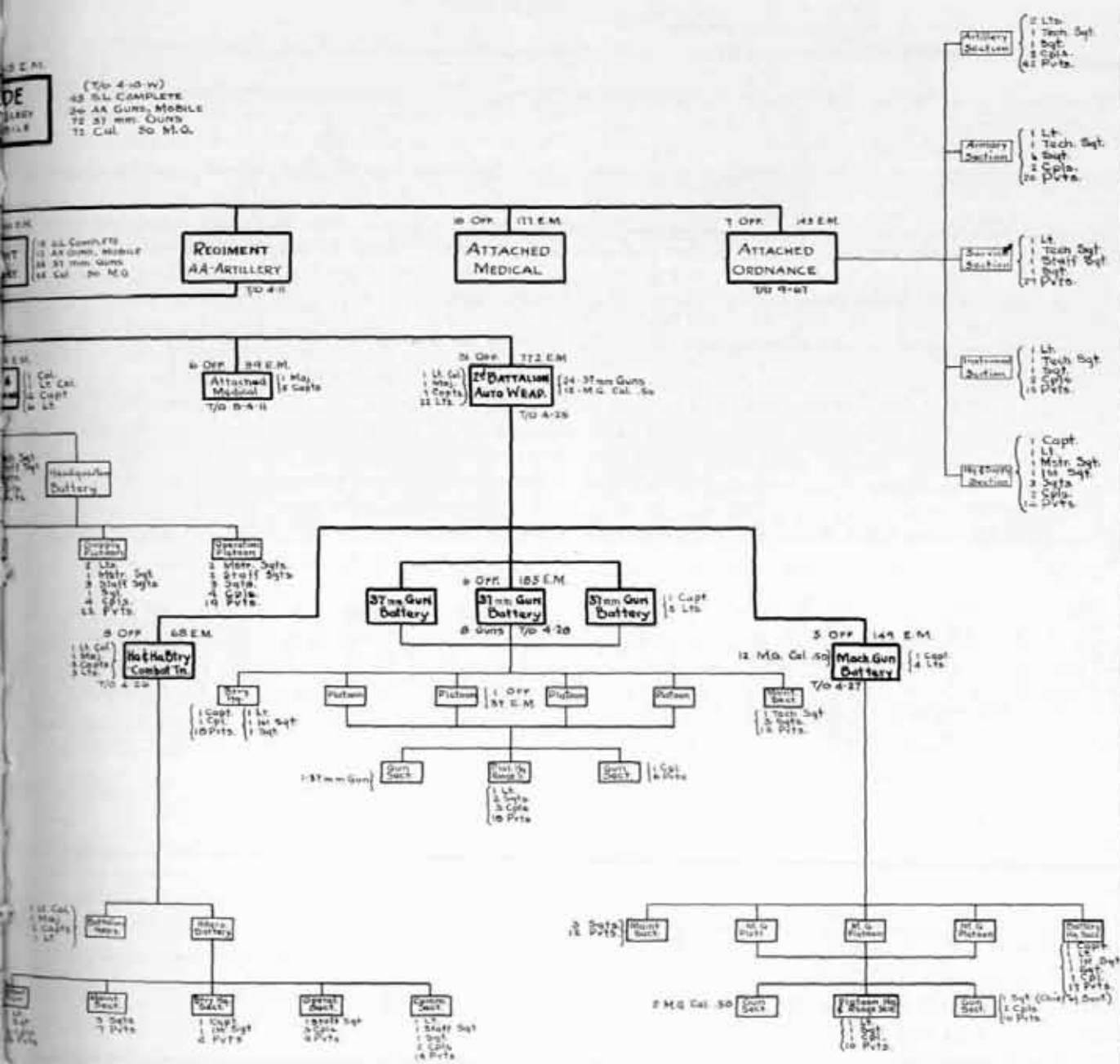
New spotting sets PH-32 are being procured with Moviolas and viewing attachments instead of the projection equipment formerly furnished. The new equipment permits more rapid review of target practice results.

A TABLE OF ORGANIZATION (SPECIAL)—APPLICABLE TO 68TH CA (AA) AND 70TH CA (AA) ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14
UNIT	T/O No.	T/O Strength	Enlisted Men— In addition to those shown in T/O									Total Strength	Remarks
			Grades						(Class) Ratings				
			Stf Sgt	Sgt	Cpl	Pvt 1st Class	Pvt	Total	4th	5th	6th		
Hq & Hq Btry (less band)	4-12	89										89	No change from T/O
Hq & Hq Btry, 1st Bn	4-16-S	30										30	"
Gun Btry (each)	4-17	(122)										(122)	"
3 Gun Btrys	4-17	366										366	"
Searchlight Btry	4-18-S	130										130	"
Hq & Hq Btry, 2d Bn	4-26-S	20					1	1				21	
1 M G Btry	4-27-S	86	1	1	2	1		5	1	1	1		
3-37mm Btrys													
Each Btry		(86)		(1)	(2)	(2)		(5)		(2)	(3)	(91)	
3 Btrys	4-28-S	258		3	6	6		15		6	9	273	
TOTAL		979	1	4	8	7	1	21	1	7	10	1000	



The chart reproduced on these pages is the handiwork of Captain E. C. Woods, Coast Artillery Corps Reserve. Captain Woods' mobilization assignment is the organization and training section, Office, Chief of Coast Artillery.



[Drawn by Captain E. C. Woods, CA-Res]

Fort Monroe

BRIGADIER GENERAL FREDERIC H. SMITH, *Commanding*

COLONEL WILLIAM S. BOWEN
President, Coast Artillery Board

COLONEL FRANCIS P. HARDAWAY
*Post Executive; Commanding Harbor Defenses of
Chesapeake Bay and 2d Coast Artillery*

LIEUTENANT COLONEL DELMAR S. LENZNER
Commanding Submarine Mine Depot

COLONEL ELI E. BENNETT
Executive, Third Coast Artillery District

COLONEL RICHARD F. COX
Commanding 70th Coast Artillery (AA)

LIEUTENANT COLONEL HAROLD F. NICHOLS
Acting Assistant Commandant, Coast Artillery School

By Major L. W. Goepfert and Lieutenant J. DuV. Stevens

November usually brings to mind turkey and football, but at Fort Monroe even these old standbys have been relegated to the background. If change be the first law of life and nature, then Fort Monroe is really living, for things have been happening in such rapid succession that even old Saint Nick is going to have a tough time finding a place in the hum of our present activity.

The 51st Coast Artillery has departed for Puerto Rico; Coast Artillery School class instruction has been intensified in view of the shortened courses this year; officers and cadres are departing to organize and train embryo organizations already developing at other parts on the eastern seaboard; the old athletic trophy season has closed and the new season has been inaugurated; the dramatic club has opened the season with its customary brilliant performances; and a brand new regiment—the 70th Coast Artillery (AA)—is springing to life right in our midst.

1ST BATTALION, 51ST COAST ARTILLERY DEPARTS

On October 16th, the post turned out to say good-bye and good luck to the 1st Battalion, 51st Coast Artillery, which sailed that day on the U.S.A.T. *St. Mihiel* for its new station, Camp Buchanan, San Juan, Puerto Rico. The 2d Coast Artillery band was on hand to play appropriate music as eleven officers and 294 men, headed by Lieutenant Colonel B. L. Flanigen, commanding officer, set sail for service in the Puerto Rican Department. Previously, a detachment of fifty men, commanded by Lieutenant William G. Fritz, had sailed from New York to join the 51st at San Juan.

Prior to sailing, a *despedida* for the officers and ladies of the 51st had been held at the Casemate Club. This party also saw the gala opening of the club, but sentiments of regret at the departure of old friends were mingled with those of excitement and anticipation of new adventures and service lying ahead.

The noncommissioned staff officers' club tendered a similar party at their clubhouse to the departing noncommissioned officers.

The departure of the 51st has already been keenly felt in all branches of post activity. Fort Monroe extends sincere best wishes to a fine outfit in its new service.

PERSONNEL

Reorganization and activation of new organizations throughout the Coast Artillery has produced extensive

changes in personnel at this station. Lieutenant Colonel Paul H. French, Captain G. E. Keeler, and Lieutenant J. W. Walker, all of the 2d Coast Artillery have left for duty with the newly organized 68th Coast Artillery (AA) at Fort Williams, Maine. Lieutenants E. E. Hackman and W. McR. Vann, 2d Coast Artillery, have left for temporary duty with the Panama Coast Artillery Detachment at Fort Preble, Maine, while Lieutenants W. J. Worcester and B. R. Luczak, 2d Coast Artillery, have gone to Fort Jay, New York, for similar duty. Early in November a cadre of nineteen men proceeded to Fort DuPont, Delaware, and will probably form the nucleus for a new unit in Panama.

Fourteen Thomason Act officers have left for stations and duty with Panama Coast Artillery Detachments as indicated below:

Fort Hancock: Lieutenants E. J. Wallace and G. K. Miller.

Fort DuPont: Lieutenants A. L. Cox and W. R. Rainev.

Fort Hamilton: Lieutenants J. M. Edmunds, W. H. Ewart, W. J. Williams, and W. Y. McCachern.

Fort Wadsworth: Lieutenants A. K. Adkinson, G. Bazaco, C. M. Gilbert, and N. Oncha.

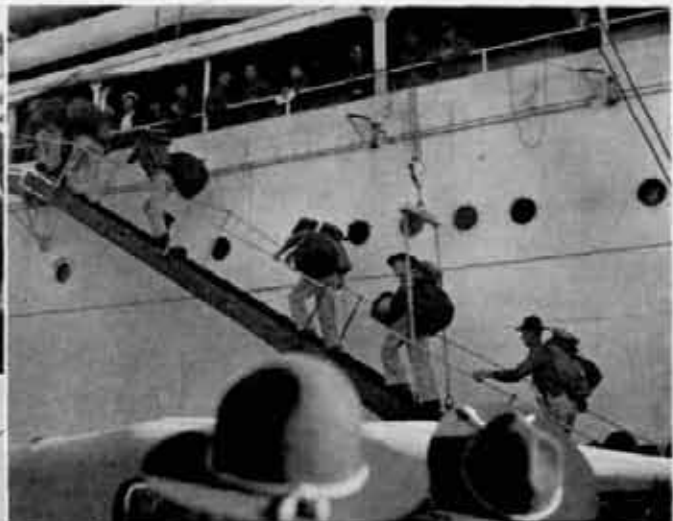
Fort Jay: Lieutenants W. H. Neill and W. F. Williams.

ATHLETICS

The race for the post athletic supremacy trophy wound up in a close finish with Headquarters Battery, 2d Coast Artillery, annexing the baseball championship for the third straight year and thereby clinching the supremacy trophy itself for the second successive year. The winning battery, Captain L. G. Ross, commanding, scored fifty-eight points. Headquarters Battery, 51st Coast Artillery, was in second place with forty-eight points and Battery F, 52d Coast Artillery, third, with forty-three and one-half points. The absence of the 51st will be keenly felt during athletic season but many promising recruits from the 70th are expected to produce real athletic competition in the near future. Bowling and two-hand touch football are under way with boxing and basketball in the offing.

DRAMATICS

The Fort Monroe Dramatic Club has recently elected the following officers for the coming year: President, Major F. R. Chamberlin; Vice-President, Mrs. C. E. Shephard; Secretary-Treasurer, Lieutenant R. G. Finken-



Scenes at Fort Monroe as the 51st left for Puerto Rico

aur; Business Manager, Lieutenant Colonel E. L. Poland; Stage Manager, Lieutenant G. U. Porter. After many vicissitudes occasioned chiefly by personnel changes and recastings, the club presented two splendid one-act plays in November in the new post theater. Members of the garrison were hearty in their praise of both productions; *The Black Suitcase* directed by Mrs. G. A. Chester; and *Army Postnuptial* written and directed by Lieutenant R. G. Finkenaure. In view of the fine opening a highly successful season is envisioned.

70TH COAST ARTILLERY (AA) ACTIVATED

The organization of the 70th Coast Artillery (AA), which when fully recruited will almost double the enlisted strength of Fort Monroe, holds the spotlight at present. Colonel R. F. Cox, formerly assistant commandant of the Coast Artillery School, commands the regiment and Lieutenant Colonel F. E. Emery, Jr., is executive. Other officers ordered to the 70th include Captain C. B. Wahle, J. E. Reiersen, C. F. Tischbein, H. C. Parks; Lieutenants

A. L. Fuller, Jr., A. M. Lazar, P. H. Wollaston, J. W. Romlein, J. M. Banks, and J. E. Wood, Jr. The development and training of the new regiment is proceeding apace and the metamorphosis from recruit to soldier is already apparent in the carriage and physique of the men. Training in antiaircraft artillery technique is well under way and will proceed as rapidly as arrival of new material will permit.

With two hustling regiments as well as the various special agencies of our Corps located here, Fort Monroe is assuming an increasing importance and can justifiably claim to be the Mecca of the Coast Artillery.

Lieutenant Colonel Delmar S. Lenzner has taken over command of the submarine mine depot, succeeding Colonel Joseph F. Cottrell who has departed for the Philippines.

Lieutenant Colonel Harold F. Nichols, has been named acting assistant commandant, Coast Artillery School, succeeding Colonel R. F. Cox, now commanding the 70th Coast Artillery.



Puerto Rico

BRIGADIER GENERAL EDMUND L. DALEY, *Commanding*

By Lieutenant Peter S. Peca

The establishment of the Puerto Rican Department has set up a new field of Coast Artillery activity. Today as a result of the emergency announced by the President the Coast Artillery will constitute a major component of the Puerto Rican garrison.

Although there were no Coast Artillery units in Puerto Rico at the time of the inception of the department, the Coast Artillery Corps was represented at department headquarters. Brigadier General Edmund L. Daley, department commander, came here from the very active and important First Coast Artillery District with headquarters at Boston. General Daley evidences the same interest in Coast Artillery matters that he did in the First Coast Artillery District. General Daley's able G-4, Lieutenant Colonel Charles W. Bundy, Coast Artillery Corps, contributed much in planning for the adequate defense of Puerto Rico.

Warrant Officers James E. Goodwin and Presley J. Grove, Technical Sergeant Gilbert Thompson, Sergeant William E. Moore, Corporal Joseph Bingel, Privates First Class John P. Mikulak and John O'Riley are former Coast Artillerymen on duty here. Sergeant Thompson has had

considerable experience at the Coast Artillery School with the Organized Reserves. During his service here he has been promoted from staff sergeant to technical sergeant.

On September 25th, the U. S. Army transport *Chateau Thierry* arrived from San Francisco with Battery D, 69th Coast Artillery (AA), with the 3d Platoon, Battery A, 69th attached. The organization is commanded by Captain William F. McKee. Other officers in the battery are Lieutenants Robert Totten, Harrison F. Turner, and Kermit R. Schweidel. This organization has the distinction of being the first organization to arrive in Puerto Rico. Notwithstanding adverse conditions the organization unloaded the transport in record-breaking time. At present, the unit is encamped at Camp Buchanan, located about eight miles from the Post of San Juan, where it is preparing itself for a period of strenuous field duty.

Within the next two weeks the Coast Artillery matériel and personnel will be augmented by the arrival of the 1st Battalion, 69th Coast Artillery (AA), less Battery D, from Galveston, and the 51st Coast Artillery (TD) from Fort Monroe. These units will also be encamped at Camp Buchanan for intensive field service.

The overseas movement of these Coast Artillery units presents an opportunity for training and experience rarely afforded in ordinary operations. That they will embrace it with the typical Coast Artillery spirit of accomplishment, goes without saying.

The Puerto Rican Department extends a hearty welcome to these troops. From the department commander down, all hands will endeavor to make their tour of Puerto Rican duty pleasant as well as profitable.



FIRST AA OUTFIT FOR PUERTO RICO

This is First Sergeant Leslie J. Dempster, Battery D, 69th Coast Artillery on the docks at San Juan, Puerto Rico.



The Chateau Thierry brings Coast Artillerymen to man the air defenses of the new Puerto Rican department.

Panama Provisional Coast Artillery Brigade (AA)

BRIGADIER GENERAL SANDERFORD JARMAN, *Commanding*

COLONEL W. R. NICHOLS

Executive

CAPTAIN L. W. BARTLETT

Communications and Intelligence

CAPTAIN M. K. DEICHELMAUN

Plans and Training

LIEUTENANT C. G. PATTERSON

Adjutant and Publicity

72d Coast Artillery (AA)

LIEUTENANT COLONEL C. R. FINLEY, *Commanding*

LIEUTENANT W. M. SKIDMORE

Aide-de-Camp

LIEUTENANT W. L. HEROLD

Aide-de-Camp

LIEUTENANT F. A. BOGART

Munitions, Supply and Assistant Plans and Training

73d Coast Artillery (AA)

LIEUTENANT COLONEL W. M. CHAPIN, *Commanding*

By Lieutenant C. G. Patterson

The historical record of the Panama Provisional Coast Artillery Brigade (AA) began with GO No. 22, Headquarters Panama Canal Department, which formed the antiaircraft artillery elements of the 1st and 4th Coast Artillery into an AA brigade effective November 1st. However, even before the effective date, radio orders had been received from the War Department redesignating the 1st and 4th Coast Artillery as harbor defense regiments and constituting the two new antiaircraft regiments. The antiaircraft elements of the 1st Coast Artillery furnished the increment for the 72d, while the 4th Coast Artillery furnished men for the 73d.

Prior to the date of organization, General Jarman had assembled his staff and started work. Personnel problems were adjusted and all preparations were made to issue orders transferring men into the new regiments as of November 1st. Short range training programs were prepared to conform to the training prescribed for an antiaircraft artillery brigade. Under a directive from the department commander, the brigade commander is charged not only with the antiaircraft artillery defense of the canal, but also with all ground antiaircraft defense, including passive defense, plans for coordination between arms, as well as the duties of advisor to the department commander on all matters that pertain to Coast Artillery.

The first step towards welding the AA defenses into a unit under a single command was accomplished without incident, and an intensive training program began at once. Batteries are drilling at war positions, completing road and bivouac projects in preparation for the most intensive antiaircraft artillery training the Coast Artillery has ever attempted. The cooperation of the 19th Wing of the Air Corps promises interesting weeks ahead. The rainy season has not relented enough to permit bivouacs as yet, but we have hopes. For the first three weeks in January an intensive Air Corps—antiaircraft exercise is scheduled. Following this period, the 73d moves to firing positions for target practice (firing phase), while the 72d conducts the gun detection phase and searchlight exercises from war positions on the Atlantic side. After three weeks, the 72d moves to firing positions for target practice while the 73d conducts the gun detection phase and searchlight

exercises from Pacific side war positions. With a total of twenty-one gun batteries to fire, there will be little chance to waste time. To complete the intensive training, department maneuvers appear on the calendar starting March 4th. For the first time in this department, AA troops will participate as such in a big way.

Construction goes on apace. The troops that arrived from the 61st, 62d, and 63d Coast Artillery in September are all in barracks built largely by troop labor. With the increase in troops in the department, athletics are due for an expansion program. Since we have the two largest regiments in the department, we hope to have a look in at every athletic trophy. The present schedules will continue for this season, but with the beginning of the next season we hope to see the antiaircraft artillery colors fly in every athletic event.

"Commence Firing!" has been given for the Panama Provisional Coast Artillery Brigade (AA).

72D COAST ARTILLERY (AA)

By Captain M. B. Raymond

On September 21st, the peaceful serenity of Fort Randolph was shattered by the arrival of thirteen officers and 408 men of the 62d Coast Artillery (AA) from Fort Totten and two officers and thirty men of the 61st Coast Artillery (AA), from Fort Sheridan. Their arrival was not entirely unexpected and construction had already started on new barracks to house the refugees. But the buildings were not ready for occupancy and the men went into tents out on the seacoast battery parapets. Work on the new barracks was given first priority and on November 7th every man was out of the tent camp.

On November 1st the 72d Coast Artillery (AA) was activated. All men in the 1st Battalion, 1st Coast Artillery, including the augmentation from the 61st and 62d Coast Artillery, plus Batteries G and H at Fort Sherman were transferred into the 72d. The regiment at present is composed of four battalions, three at Fort Randolph, and one at Fort Sherman.

The organization assignments are as follows:

Commanding	Lieutenant Colonel C. R. Finley
Executive	Major A. W. Gower

Adjutant	Captain M. B. Raymond
Communication and Intelligence	Lieutenant R. W. Moore
Plans and Training	Captain F. F. Miter
Supply and Munitions	Lieutenant W. H. Harris
Post Exchange	Lieutenant G. N. Adams
Hq. Battery	Captain F. F. Miter
1st Battalion	Major L. D. Farnsworth
Battery A	Captain R. W. Russell
	Lieutenant J. J. Ravick
Battery B	Lieutenant W. F. Spurgin
Battery C	Lieutenant J. W. Rawls, Jr.
2d Battalion	Major N. L. Adams
Battery G	Lieutenant Alan Seff
Battery H	Lieutenant G. L. Kushner
Battery I	Lieutenant F. B. Reybold
Battery K	Lieutenant P. V. Doyle
Battery L	Captain R. L. Miller
	Lieutenant J. P. A. Kelly
Battery M	Captain A. J. Lepping
3d Battalion	Major H. G. Archibald
Battery N	Captain J. R. Goodall
	Lieutenant J. R. Bailey, Jr.
Battery O	Lieutenant M. S. George
Battery P	Captain D. J. Bailey
Battery Q	Lieutenant M. D. Dougan
Battery R	Captain C. W. Gettys
	Lieutenant M. J. Krisman
4th Battalion	Captain W. L. Wright
Battery V	Captain W. L. Wright
	Lieutenant P. M. Royce
Battery W	Lieutenant J. G. Nelson

The activities of the regiment, all of which are classified as first priority, are numerous, diversified and highly exacting. Three sets of officers' quarters are being constructed, the old and dilapidated quarters are being rehabilitated, the post itself is in process of being beautified. Meanwhile intensive training as tactical positions is being held three days a week.

We are without a regimental history, but as to our future, it is safe to predict that time will not hang heavily on our hands.

73D COAST ARTILLERY (AA)

By Captain A. Roth

The 73d Coast Artillery (AA) was organized on November 1, 1939, from personnel of the 1st Battalion, 4th Coast Artillery. Before the organization of the new regiment, the AA battalion of the 4th Coast Artillery had been augmented by detachments from the 61st Coast Artillery (AA), Fort Sheridan, and the 63d Coast Artillery (AA), Fort MacArthur, so that the 73d Coast Artillery (AA) is actually constituted of approximately the same number of men from each of the three organizations named.

The 63d Coast Artillery (AA) detachment departed from San Pedro on the USAT *Hunter Liggett*, September

2, 1939, and arrived at Balboa on September 10th. After a short period, during which the men were quartered in a tent camp on the Fort Amador parade ground, the detachment moved into newly constructed wooden barracks along the canal bank in rear of the line of barracks.

The 61st Coast Artillery detachment left Fort Sheridan by troop train September 9, 1939, for the Brooklyn Army Base. It departed from Brooklyn September 15, 1939, and arrived at Coco Solo on the 21st, where two officers and thirty enlisted men were detached for duty with the 1st Coast Artillery. The remainder of the detachment arrived at Balboa September 23, 1939, and after a short period in tents, moved to the newly constructed barracks.

Both detachments were transferred to the 4th Coast Artillery upon arrival and served with that organization until November 1st, when together with members of the original 4th Coast Artillery, they became the 73d Coast Artillery (AA).

Since the formation of the new regiment, details of battery organization have been completed and preparations made for intensive antiaircraft artillery training at outlying positions.

Assignments within the regiment are as follows:

Commanding	Lieutenant Col. W. M. Chapin
Executive	Major J. L. Hayden
Temporary duty.	
Asst. G-3, P.C.D.	Major R. N. Mackin
Adjutant	Captain A. Roth
Communication and Intelligence	Lieutenant C. E. Green
Plans and Training	Captain P. W. Edwards
Supply and Munitions	Captain P. Elias
Headquarters Bat.	Captain P. Elias
Battery A	Captain M. R. Thompson
Battery D	Captain W. H. Hennig
Battery E	Captain J. F. Gamber
Battery G	Lieutenant W. C. Debill
Battery I	Lieutenant A. D. Robbins
Battery K	Captain L. R. Bullene
	Lieutenant M. G. Megica
Battery L	Lieutenant E. E. Lockhart
Battery N	Captain M. H. Harwell
Battery O	Captain A. E. Wilson
	Lieutenant R. M. Fitzgerald
Battery Q	Lieutenant R. M. Hardy
	Lieutenant R. W. Boughton, Jr.
Battery S	Lieutenant I. D. Roth
Battery T	Captain J. W. Davis

We too are without a regimental history, but if the last few weeks are any criterion, history is in the making.

FORT SHERMAN

The months of September and October saw the completion of several interbattery sports on the post and the beginning of several new athletics. In addition, the Atlantic Sector basketball season was completed in unusual style, the 1st Coast Artillery being the only team to de-

feat the winners, Fort Davis. In so doing, they tied for second place.

Battery C, the winner of the post commander's trophy for 1938-39, continued its success by taking first place in the duckpin league following a playoff with Headquarters Battery, first place in the pool league, and first place in the swimming meet. This battery also took first place in the interbattery boxing league.

Baseball, softball, and volleyball are the main active sports at present. Battery C leads the volleyball league, and shows unusual strength in all of its games. Baseball and softball are in the preliminary stage of practice. All teams show great promise for the season, and it is expected that all games in the league will be hard fought.

On October 26th, Fort Sherman was honored by a visit of Brigadier General Sanderford Jarman, commanding general of the newly organized Panama Provisional Antiaircraft Brigade. Upon his arrival, General Jarman was met by a guard of honor commanded by Captain R. W. Russell. After an inspection of several of the seacoast and antiaircraft installations on the post, the general gave a short talk to the officers and enlisted men who are to become members of the new antiaircraft brigade.

The new Atlantic Sector commander, Brigadier General J. M. Cummins, arrived on October 27th, and was welcomed at Fort DeLesseps by a guard of honor from the 2d Battalion, 1st Coast Artillery. General Cummins replaces brigadier General R. C. Moore, who has taken command of the infantry brigade at Fort Davis.

FORT AMADOR

New and recent construction has changed the appearance of the post a great deal since the last report. In September some 225 men arrived from Fort MacArthur and 200 from Fort Sheridan. These were all trained antiaircraft artillerymen, and were immediately assigned to gun batteries. Needless to say, the existing barracks could not accommodate them. Temporary wooden barracks have been rushed to completion on the canal bank, and the men housed in tents on the parade ground. The fourteen officers who accompanied the detachments have been crowded into bachelor quarters and married officers' sets, pending the completion of a new set. Several small officers' sets, a bachelor noncommissioned officers' set, and a barracks for the Medical Corps detachment will be finished within a few weeks.

Recent arrivals included Major H. P. Detweiler, Captains H. H. Duval, J. F. Gamber, and P. W. Edwards, Lieutenants D. R. Coru, R. W. Hardy, M. G. Megica and R. W. Boughton. In addition, Major R. N. Mackin, Captains Paul Elias, Arthur Roth, M. R. Thompson, and M. K. Deichmann, and Lieutenant I. D. Roth, joined us recently. Other arrivals included Majors W. W. Scott and A. M. Jackson, Captains L. W. Bartlett, and



AWARDED SOLDIER'S MEDAL

Corporal Sam Raiman, Headquarters Battery, 4th Coast Artillery, who recently won the Soldier's Medal for heroism in rescuing a soldier from drowning in Panama Bay.

A. E. Wilson, and Lieutenants J. C. Bane, R. J. Belardi, and J. O. Herstad. Captain Samuel Rubin has brought the U.S.A.M.P. *Ellery W. Niles* for duty at Fort Amador.

Losses among the officers include Lieutenant Colonel Harold E. Small, who departed during October for duty at Fort Totten, Captain M. A. Hatch who also goes to Fort Totten, Captain O. A. Nelson who goes to Fort Adams, and Lieutenant L. H. Ripley, bound for Fort MacArthur.

Battery G, 4th Coast Artillery, won the Senora Amador Cup for excellence in artillery and target practice during the 1939 target practice season. Battery G mans the 14-inch railroad guns.

Battery C won the post boxing championship and also a special award for having the highest percentage of the organization participating in the season. They established the enviable record of placing first, second and third, in the bantam and lightweight divisions, and of having four championships and four runners-up out of the ten classes. In the sector boxing league, Fort Amador leads all other posts in the sector by over one hundred points after the first two fight programs. Interbattery baseball is under way between rainstorms, but it is too early to predict the champions.

Hawaiian Separate Coast Artillery Brigade

BRIGADIER GENERAL FULTON Q. C. GARDNER, *Commanding*

LIEUTENANT COLONEL C. M. S. SKENE, *Chief of Staff*

MAJOR F. A. MACON, *Adjutant General & S-1*

CAPTAIN G. SCHMIDT, *S-2 & Gunnery*

LIEUTENANT COLONEL J. H. LINDT, *S-3*

LIEUTENANT COLONEL R. M. PERKINS, *S-4*

CAPTAIN I. H. RITCHIE
Com. and Engineer Officer

CAPTAIN W. H. KENDALL
Sec. Ath. Officer

CAPTAIN S. E. WHITESIDES, JR.
Chemical Warfare Officer

LIEUTENANT W. A. CALL
Ordnance Officer

COLONEL E. B. WALKER

Commanding Harbor Defenses of Pearl Harbor

COLONEL CHARLES K. WING
Commanding 64th Coast Artillery (AA)

COLONEL W. D. FRAZER
Commanding Harbor Defenses of Honolulu

By Lieutenant Milan G. Weber

RAIN ON OAHU

At the time that this letter is written (October 23d) a heavy rainfall is occurring over all of Oahu. In the last twenty-four hours 6.69 inches of water fell on downtown Honolulu. Kalihi Valley, where Fort Shafter is situated, reported 8.71 inches in the same period of time. Large sections of the Nanakuli and Waianae areas were flooded with three feet of water. Eight thousand telephones were out of order in Honolulu.

Headquarters Battery, 64th Coast Artillery, was flooded out of its Nanakuli beach camp and had to move back on the post. The officers' shower bath at the camp was carried off to sea. The rain has temporarily disrupted the schedule of the 3-inch antiaircraft gun firing that was being held south of Nanikuli. The gun batteries were in position and in the midst of firing the night practices using the angular unit method of adjustment when the rains came. Fortunately the guns themselves and the lettered battery camps are situated on higher ground so that the schedule can be resumed on the cessation of the rainfall.

Battery D, 16th Coast Artillery, had a detachment of men camped in the vicinity of Barber's Point for searchlight training in connection with the night missions of the 64th Coast Artillery. This detachment left the camp this morning and returned to Fort DeRussy.

During the night, the parade ground and some of the roads at Fort DeRussy were under water, but no lasting damage has been reported. Fort Kamehameha's telephone communications were hampered somewhat by the rain, about sixty lines being temporarily out of order.

HIGH SPEED TARGET PRACTICES

Batteries D, E, and F, of the 55th Coast Artillery, fired high speed 155-mm. gun practices from the beach at Fort DeRussy on September 20th. A water-spout target towed by a Navy destroyer (converted into a mine layer) was used. All firing was done by the Case II method.

COAST GUARD COÖPERATION

Before the target practice season got under way, General Gardner contacted the commander of the Hawaiian

section of the U. S. Coast Guard and made arrangements for the clearing of the field of fire for all record practices. The Coast Guard cutter clears the field of fire prior to each practice and stands by on the side of the area during the firing. The work accomplished by the Coast Guard has been excellent and a great deal of time has been saved thereby.

RIFLE MARKSMANSHIP

Troops from the Harbor Defenses of Pearl Harbor and Honolulu are now engaged in rifle marksmanship. Under the supervision of Colonel W. D. Frazer a new small bore, machine-gun, and pistol range has been constructed at Fort Ruger. This range, with thirty-six targets, can accommodate an entire battalion at one time. This excellent new arrangement is reflected by a higher percentage of qualifications than in previous years.

PERSONNEL CHANGES

Colonel H. C. Merriam sailed for the mainland on September 19th leaving behind him a host of friends in the Islands. Everybody regrets his departure and wishes him the best of fortune and good luck in his new assignment with the Inspector General's Department in Chicago, Illinois.

Colonel Eugene B. Walker arrived in the Islands on October 6th and assumed command of the Harbor Defenses of Pearl Harbor. Lieutenant Colonel Robert H. VanVolkenburgh had been temporarily in command since the departure of Colonel Merriam. Lieutenant Colonel Shuey E. Wolfe is the new executive of the Harbor Defenses of Honolulu. Captain Hobart Hewett is on duty with the department staff as assistant G-3. Other arrivals are: Majors Watson L. McMorris, CAC (PH), H. E. Pendleton, CAC (PH), and M. G. Armstrong, CAC (64th), Captains R. E. Dingeman, CAC (PH), W. J. McCarthy, CAC (PH), W. S. Lawton, CAC (Hon), and D. D. Martin, CAC (PH), Lieutenants F. W. Ebey, CAC (PH), R. W. Hain, CAC (PH), A. A. Koscielniak, CAC (PH), R. K. Kauffman, CAC (64th), and D. B. Nye, CAC (PH).

CHANGES IN BRIGADE STAFF

Lieutenant Colonel Robert M. Perkins is the brigade's new S-4. He arrived in the Islands on September 14th, from duty with the General Staff in Washington. Captain Grayson Schmidt took over the duties of brigade S-2 and gunnery officer on September 20th. He had previously been assigned to Fort Kamehameha. Lieutenant William A. Call, ordnance officer, for the past two years, leaves the Islands on November 15th for his new assignment with the Ordnance Field Service School at Raritan Arsenal, New Jersey. His place will be taken by Lieutenant Colonel Robert S. Barr, Ordnance Department, a former Coast Artillery officer now on duty with department headquarters.

Lieutenant Colonel C. M. S. Skene, chief of staff of the brigade, flew to the mainland by clipper on October 13th for a two-weeks vacation. Lieutenant Colonel J. H. Lindt is acting chief of staff.

ATHLETIC NOTES

The tennis team of the Harbor Defenses of Honolulu, coached by Lieutenant W. S. Coit, won the sector tennis trophy for the second consecutive year. A paddle tennis tournament is now in progress at Fort DeRussy. Lieutenant W. A. Call defeated Captain P. S. Kelly to win the men's singles. Mrs. W. J. Carne won the ladies' singles. The finals of the mixed doubles are still to be played between Lieutenant and Mrs. W. A. Call and Captain S. G. Stewart and Mrs. M. G. Weber.



Fort Sheridan

By Major C. S. Harris, Coast Artillery Corps

The 61st Coast Artillery (AA) has experienced its due share of activity incident to Army expansion. Upon the departure of seven officers and 226 men for Panama in September, the regiment moved into its new barracks in the southern part of the post, opposite Camp Leonard Wood.

Thereupon recruits began to arrive to replace the vacancies. By the end of the month the quota had been filled, and the regiment then prepared to move to the Harbor Defenses of Portland, Maine. But these preparations were halted early in October, and the regiment settled itself at Fort Sheridan for the winter.

With the increase in strength to a full regiment, recruits began to arrive and by November 1st, the regimental strength had increased to 1,000. Assignment to the 61st Coast Artillery appears to be a popular choice for the Middle West youth, who is ready to take on a hitch in Uncle Sam's armed services.

Four officers and forty-five men are out on recruiting parties throughout Illinois, Wisconsin, and Michigan, until November 12th. By that date, it is anticipated that the regiment will be up to strength.

The recruit training is in full swing, under the supervision of Captain William E. Griffin. Already his force is beginning to present a formidable appearance in their daily maneuvers on the parade ground.

In October, Major General Archibald Sunderland, Chief of Coast Artillery, stopped over en route to the West Coast and made an informal inspection of the regiment and its training facilities. During this inspection,

the searchlight and gun batteries demonstrated their proficiency at artillery drill. The new men of the machine-gun battery put on a demonstration, firing at free balloons. After the inspection, Lieutenant Colonel and Mrs. John L. Homer entertained the officers and ladies of the post at a buffet supper at the officers' club in honor of General Sunderland.

The following recently appointed officers have joined the regiment: Second Lieutenants Charles C. Pulliam, U.S.M.A. '39, Richard deF. Cleverly, U.S.M.A. '39, David Y. Nanney, U.S.M.A. '39, Robert S. Chester, U.S.M.A. '39, William L. Thorkelson, University of Wisconsin '39, Robert B. Barry, University of Michigan '39, and Charles L. P. Medinnis, U.S.M.A. '39.

In November Lieutenants Pulliam, Nanney, Medinnis, and Chester departed for temporary duty with Panama Canal Coast Artillery detachments in New York harbor. Lieutenant Cleverly departed for Portland, Maine, to join the 68th Coast Artillery (AA).

Upon the department of 5th Division Headquarters for Camp McClellan, Alabama, Lieutenant Colonel Homer assumed command of the post. Regimental headquarters were moved to post headquarters to take over until the 5th Division returns next spring.

During the latter part of October, the batteries participated in firing practices and searchlight exercises with towing and tracking service by the 15th Observation Squadron. Under present plans, the month of December will be devoted to further firing exercises.

Corregidor

BRIGADIER GENERAL WALTER K. WILSON, *Commanding*

COLONEL FREDERIC A. PRICE, *Executive*

LIEUTENANT COLONEL R. B. PATTERSON, *Adjutant General & S-1*

LIEUTENANT COLONEL E. O. HALBERT, *S-2*

LIEUTENANT COLONEL C. E. COTTER, *S-3*

CAPTAIN PAUL W. COLE, *S-4*

COLONEL R. P. GLASSBURN,
Commanding 59th Coast Artillery (HD)

COLONEL WILLIAM C. KOENIG
Commanding 60th Coast Artillery (AA)

COLONEL WILLIS SHIPPAM
Commanding 91st Coast Artillery (PS) (HD)

LIEUTENANT COLONEL J. B. CRAWFORD
Commanding 92d Coast Artillery (PS) (TD)

By Lieutenant Colonel R. E. Phillips

The outbreak of the European War coincided with the opening of the outdoor training season for these defenses. For a time, short-wave radio sets bringing in the war news attracted more interest than the firing activities with small arms, antiaircraft and beach defense machine guns, and beach defense artillery. Further listening convinced us that distance lent neither veracity nor enchantment to the script of the radio commentator and all concerned have returned to normal listening hours so that training carries on as usual. Although preliminary announcements of the streamlined infantry drill regulations reached the Philippines on schedule; the new FM-22 is still missing, perhaps an unknown casualty of submarine warfare.

August saw the completion of the series of officers' conferences. Three distinguished veterans of the Command and General Staff School rostrum delivered lectures that were outstanding both in interest and instructional value. Their subjects were: Defense Against Mechanized Units by Colonel Jesse C. Drain, 31st Infantry; Supply Problems in the Philippine Department, by Lieutenant Colonel Robert McG. Littlejohn, QMC; and The Lessons of Gallipoli in Relation to Philippine Defense, by Lieutenant Colonel James B. Crawford, CAC. The Harbor Defense Chemical Warfare School, with Captain J. R. Burns, CWS, as senior instructor, gave a two-week course for unit gas officers and a four-week course for unit gas non-commissioned officers; graduating nineteen officers and sixty-three noncommissioned officers. The graduates are now giving second-phase instruction on chemical warfare to their respective batteries and detachments.

This is the season for loony golf tournaments. The blind bogie tournament is over, as is the handicap tournament. Yet to come are the one-club and the marathon tournaments. In keeping with the tournament style for the season, the golf committee has instituted traffic control on the golf course by installing a semaphore at the crest which cuts across the blind fifth and sixth holes. Plans are under way for further improvements along this line by installing a photo-electric eye which will respond when golf ball passes the crest and causes a loudspeaker to yell "Fore!"

The boxing season was officially opened by the 60th Coast Artillery with a regimental smoker on September 20th.

The department bowling tournament is being held at

Fort Mills from September 23d to October 2d. Officers from Fort Mills and Fort William McKinley are entered in the officers' tournament. Enlisted men from Post of Manila, Fort William McKinley, Stotsenburg, Nichols Field, and Fort Mills have entered the enlisted men's tournament and the Congress—open to both officers and enlisted men—in tenpins and duckpins.

In basketball, all regiments have completed their inter-battery leagues, and are now forming regimental teams for the inter-regimental and department championships which start, respectively, on October 1st and October 14th.

59TH COAST ARTILLERY

The regiment celebrated organization day on September 12th, with appropriate ceremonies in the Topside Ciné. Colonel Glassburn gave a brief review of the history of the regiment and on behalf of the regiment received the harbor defense trophies for winning the duckpin and tennis tournaments (American) for the current season. He then presented the following trophies to the inter-battery champions of the regiment for 1939:

Volleyball.....	Battery B.
Duckpins.....	Ordnance Detachment.
Tenpins.....	Headquarters Battery.

Captain Hendrix, regimental athletic officer, gave a brief talk on the athletic achievements of the 59th Coast Artillery and displayed the post and department trophies which have been won during the past year. Major McBride, regimental plans and training officer, gave a synopsis of the artillery accomplishments of the regiment. General Wilson, our harbor defense commander, complimented the regiment on its past achievements and gave an inspiring talk which will long be remembered by all who heard it. Members of the regiment then displayed their theatrical ability by producing a short skit followed by performances by a magician and several musicians.

The inter-battery basketball championship was won by Battery G from Fort Hughes which defeated Battery A by a one-point margin in a hard-fought and exciting game. The regimental basketball team, organized by selecting outstanding men from the battery teams, is holding daily practices under the supervision of Captain Hendrix and Lieutenant Hauck.

Since our "outdoor" season officially began on Septem-

ber 5th, after the conclusion of gunners' instruction, all batteries have been busy with small arms firing and with machine gun, 37-mm. and 75-mm. gun firing from their beach defense positions.

60TH COAST ARTILLERY

The regiment welcomed a new major when Captain Arnold D. Amoroso was promoted on August 15th. Marcia Bennett Whipple is the latest addition to the regiment, born August 12th; she was presented with a silver porringer on September 11th, according to regimental custom. Lieutenant John B. F. Dice leaves soon for the 91st as replacement for Captain Caluya who will be detailed with the Philippine Army.

In the inter-battery league Battery A won the championship on the playoff of a three-way tie. The regimental basketball team has been formed and shows promise, having defeated the 31st Infantry and Sternberg General Hospital in its first two practice games.

Our tenpin squad decisively defeated the 59th Coast Artillery for the American Championship, which equalized bowling honors.

Boxing is going full blast, in preparation for the coming inter-regimental bouts. The 60th uncovered promising material in a recent regimental smoker and plans another in the near future.

Gunners' Instruction and two months of record-breaking rains ended simultaneously. The outdoor season has started in earnest with additional assignment antiaircraft machine-gun firing well under way. Daily missions are in order for the next two months. The firing schedule is progressing nicely in spite of the difficulty of dropping targets safely in the cross wind that hits the long, narrow landing field. If the wind is misjudged, it means a target lost in the water and a zero score for the course.

Battery A is in the midst of intensive training for its annual searchlight practice, and has hopes that the usual cloudy weather will clear sufficiently to permit a service practice in November.

The gun battalion is concentrating on the final training of stereoscopic observers. This vital phase of training has been making steady progress for several months and the observers will be at their peak for the service practices in January.

91ST COAST ARTILLERY (PS)

The regiment completed beach defense day and night firings with machine guns, 37-mm. and 75-mm. guns on September 16th, and those batteries having AA machine guns as additional assignment began firing at towed aerial targets September 19th. Small arms firings for qualification and requalification in rifle marksmanship will begin on September 25th and on completion of these firings the

regiment will concentrate its activities on preparation for annual target practices with primary armament assignments.

Regimental athletics reached a new high in enthusiasm and entertainment. In the inter-battery tenpin tournament, Battery G—Captain Luce, commanding—captured the regimental championship for the ninth consecutive year; while in the inter-regimental playoffs, the 91st Coast Artillery (PS) again emerged as post Scout champions. At present, strong bowling teams are being organized to represent the regiment in the department bowling congress. The inter-battery basketball league closed with Battery B, Captain Caluya, commanding, as 1939 champions undefeated and untied. The regimental basketball team is now tuning up for the keen competition to be encountered in the inter-regimental and departmental schedules to begin in October. The boxing squad fought its first scheduled bouts with National University of Manila on September 27th, losing six and winning three out of nine well-fought matches.

92D COAST ARTILLERY (PS)

Since our last letter all batteries in the 92d have completed their secondary assignment antiaircraft machine-gun firings. The regiment is now engaged in firing at towed water targets with machine guns, 37-mm. and 75-mm. guns.

Battery D of the 92d, assisted by other personnel in the regiment, recently completed extensive tests of 75-mm. ammunition for the Ordnance Department. Lieutenant T. H. Harvey was in charge of the firing.

Duplicating their performance in the duckpin tournament, the officers of the 92d went ahead to decisively win the post championship in tenpins. The final standings showed the 92d officers' team leading its nearest competitor by twelve points. Captain Santos was again the individual star of the tournament winning three cups, one for high triple—624; one for high average—174.36; and one as a member of the winning team.

Lieutenant and Mrs. Haynes are receiving congratulations on the birth of a daughter at the post hospital September 22d. The new daughter of the regiment will be christened Mary Fernauld Haynes.

Captain and Mrs. John Harry are now vacationing at Baguio and will leave for China on October 9th. They will return in time to catch the November first transport and will be stationed at Fort Rosecrans, San Diego. Captain Harry has been on duty for the past two years with the Philippine Army Training Center at Fort Wint.

Captain M. M. Santos and family will depart shortly for Manila where he will go on detached service with the Philippine Army. Captain Santos has been serving as executive and adjutant of the 3d (Guard) Battalion.



First Coast Artillery District

COLONEL RODNEY H. SMITH, *Commanding*

MAJOR ROBERT T. CHAPLIN, *Adjutant*

COLONEL OTTO H. SCHRADER
Commanding Harbor Defenses of Portland and Portsmouth

COLONEL T. H. JONES
Commanding Harbor Defenses of Long Island Sound

CAPTAIN CHARLES N. BRANHAM
Commanding Harbor Defenses of New Bedford

COLONEL MONTE J. HICKOK
Commanding Harbor Defenses of Boston

MAJOR E. P. JOLLS
Commanding Harbor Defenses of Narragansett Bay

The past two months have been notable chiefly for the many readjustments in duties of Coast Artillery personnel because of the withdrawal from this area of the 18th Infantry Brigade and the accent on the current recruiting campaign. In addition, all annual target practices have been completed, as well as all annual inspections by the corps area and district commanders, with generally excellent results.

Maintenance duties, in preparation for the severe New England winter, are also getting their full share of attention, and what with the probability of increased winter training in conjunction with the National Guard and Officers' Reserve Corps, the coming months are bound to be busy for all Coast Artillery garrisons in the district.

HARBOR DEFENSES OF PORTLAND AND PORTSMOUTH

The Portland Harbor has been somewhat desolate since last October when the 5th Infantry left for the Canal Zone. We miss them lots, but *c'est la guerre*.

Our objective during the month of October was to get our equipment in shape to withstand the rigors of a New England winter.

All previous instructions relative to the 61st Coast Artillery's assignment to the Harbor Defenses of Portland have been rescinded and so far as is known now, the 61st will remain at Fort Sheridan.

Technical Sergeant Eugene M. Moore has been ordered to the Hawaiian Department and sails from San Francisco on December 6th as replacement for Technical Sergeant Roscoe C. Broadwick who has been ordered to this station.

Corporal Joseph J. Sochon, now on DS at the Coast Artillery School has been appointed staff sergeant (electrical).

HARBOR DEFENSES OF BOSTON

Several delightful parties were given in honor of Major and Mrs. Chauncey A. Gillette who recently left for Jackson, Mississippi, where Major Gillette takes over Organized Reserve duty. The best wishes of the entire garrison go with them. It is hoped that they will enjoy their new station and the mild sunny climate of Mississippi.

Godspeed was said to Captain and Mrs. Joseph Rich whose sudden departure was necessitated by unexpected orders for duty in Panama. Their many friends miss them.

The tennis courts have been deserted for the bowling alleys, which are becoming more popular as the tempera-

ture falls. The beach club at Fort Ruckman has been closed for the season.

The Fort Banks Hospital of over 100 beds is one of the finest in the Army. Both the surgical and the medical services are very efficiently maintained. The loss by transfer of seventeen men of the Medical Detachment who left for Panama temporarily handicapped the medical service in the hospital, especially in the women's ward. This shortage was made up in part by the transfer of men from the 13th Infantry to the Medical Detachment at this post.

Lieutenant Colonel Chauncey E. Dovell, who has repeatedly demonstrated his skill as a fisherman, has also won honors as a hunter. At the beginning of the season he made a wonderful start and returned to the post with a good bag of pheasant and partridge. Several of the military reservations within this command are well stocked with game, and, in addition to the sacred cod, Boston Harbor teems with lobster and many varieties of fish, which are in great demand at banquets and similar occasions.

HARBOR DEFENSES OF LONG ISLAND SOUND

By Captain Frank T. Ostberg

Fort H. G. Wright had its share of unexpected immediate-action orders during the past few months in addition to the return of the troops from the First Army Maneuvers. These activities included movement of troops to their newly organized batteries and reconditioned barracks; firing of the antiaircraft secondary armament assignments; and small arms range work and new construction—all of which combined to make an extremely eventful period.

Our commanding officer, Lieutenant Colonel William C. Foote received orders on September 8th to report on September 14th to the Army War College to attend the current session of that school. Lieutenant Merle R. Williams, Infantry, was transferred from Fort Devens to this station and detailed in the Quartermaster Corps. Captain Edward G. Austin, Dental Corps, has been ordered to Panama. Lieutenant Raymond Waldmann, Dental Corps, has been transferred here from Mitchell Field. Colonel Thomas H. Jones, our new commanding officer, was here transferred from Fort Adams. Lieutenant Ira B. Hill came from duty with the Organized Reserves at Duluth. Captain Harold P. Gard was transferred from Fort Ruger and reports from leave early in the new year.

Staff Sergeant Charles L. Fisher, Ordnance Depart-

ment, has been transferred to the Puerto Rican Department. Staff Sergeant Oscar A. Ramnes, Ordnance Department, was transferred here from Fort Bragg. Staff Sergeant Charles L. Reed, Ordnance Department, was transferred to the Panama Canal Department. First Sergeant Grover J. Cole was transferred here from Fort Sherman and has joined Battery C, 11th Coast Artillery.

The following men have been transferred to the 11th Coast Artillery: Sergeant Gustav Schwager from Fort Shafter; Sergeant Clyde K. Avery from Fort Kamehameha; and Technical Sergeant George S. Graham, Ordnance Department, from Panama.

The 11th Coast Artillery has detailed five sergeants and six corporals for recruiting duty in the State of Connecticut. A sergeant and six privates of the Medical Corps recently left for transfer to the Panama Department.

On October 19th Colonel Rodney H. Smith, district commander and Colonel Charles W. Steese, corps area ordnance officer, made a technical inspection of the armament at Fort H. G. Wright.

The Post football season is in full swing. Seven hard fought games have been played. Fifteen games will be played during the season. Batteries B and D, 11th Coast Artillery, are at present tied for first place.

The tennis tournament was won by Private Freeman Buteau, Medical Corps, 6-2, 6-3, 3-6, and 7-5.

The post small-bore rifle team is training under the supervision of Major Albert C. Chesledon, in preparation for hard competition in the Mohegan Rifle League. The league members are the strongest civilian rifle teams in this area.

Funds were recently received for the construction of seven mess halls and other buildings in the National Guard Camp. The new caretakers' quarters at Fort Michie and the commissary, utilities garage and ordnance machine shops at Fort H. G. Wright are all under construction. The foundations have been poured and we shall soon see the outside of the buildings.

On September 18th, Battery C, 11th Coast Artillery, commanded by Captain Charles E. Dunham, fired the 3-inch AA guns as an additional assignment for record; score: 198.1. Batteries A and B, fired antiaircraft machine guns on September 20th with scores of 35.1 and 36.7 respectively.

The 243d Coast Artillery, Rhode Island National Guard, was unable to hold target practices with seacoast artillery during the last two summer encampments because of poor weather. Accordingly in September five batteries of this regiment returned to Fort H. G. Wright and fired big-gun target practices. One target was destroyed and all the batteries obtained excellent results.

On September 9th the officers and ladies of the post gave Lieutenant Colonel and Mrs. William C. Foote a farewell dinner dance and wished them both success in their future undertakings. On October 10th Colonel and Mrs. Thomas H. Jones were welcomed to the post by a tea dance.

Twice monthly a special boat brings young ladies from New London for the enlisted men's dances. The organizations at Fort H. G. Wright sponsor the dances in turn and furnish light refreshments. These dances have been highly successful.

HARBOR DEFENSES OF NEW BEDFORD

By Captain Charles N. Branham

Winter is in the air at Fort Rodman—already there have been days when outdoor activity, work or play, had to be curtailed because of bad weather. All routine annual inspections by higher authority were successfully concluded before the cold weather began, and the entire garrison now devotes most of its working time to those maintenance duties that can be accomplished under shelter.

This post is fortunately situated in many ways, but its location so near New Bedford—a city of over 100,000—and the continual cordial contacts maintained with citizens eager to be "good neighbors" insure a very satisfactory substitute for the normal social activities to be found in larger garrisons, further removed from civilian centers and more dependent on themselves for social relaxation. The garrison at Fort Rodman is a happy and contented one—justly proud of its post and its accomplishments; its five-year record of 100 per cent reenlistments, no courts-martial, and no "time lost." It is confident of its ability to do efficiently whatever may become necessary to be done—whenever and wherever duty may demand.



Harbor Defenses of Puget Sound

COLONEL JAMES H. CUNNINGHAM, *Commanding*

By Lieutenant Frederic H. Fairchild

The most important event of the last two months was the visit of the Chief of Coast Artillery. General Sunderland arrived in Seattle, via the *Empire Builder*, the morning of Sunday, October 15th, and with Colonel Cunningham came up to Fort Worden via the Mukilteo Ferry, Fort Casey and the Port Townsend Ferry. On the ferry he met a delegation of citizens who explained the proposed projects for a boat harbor and ferry dock at Fort Casey.

On Sunday evening the officers' club honored General Sunderland with a reception, at which he had the opportunity to meet his many friends in Port Townsend. The general has served twice in these defenses, once as commanding officer, and once as a younger officer at Fort Ward. Monday and Tuesday were spent in inspecting the many activities of the harbor defenses, and on Tuesday, Colonel and Mrs. Cunningham entertained General Sunderland at a buffet lunch.

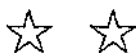
On Wednesday, General Sunderland visited Colonel Ottosen and the ROTC at the University of Washington, lunched with President Sieg and Colonel Ottosen at the Rainier Club, briefly conferred with Major Stewart at Organized Reserve headquarters and left for San Francisco, via Portland and Fort Stevens, during the afternoon.

General Sunderland's itinerary included Los Angeles, San Diego, Houston, Mobile and Fort Barrancas, at all of which places he inspected the many and widespread activities of the Coast Artillery.

Service practice was completed at Battery Brannon 12-inch mortars and Battery Benson 10-inch guns prior to departure of the *Niles*. We have yet to fire Battery Tolles (6-inch guns), and the 3-inch fixed antiaircraft battery.

Pin spotters are now being installed on each of the four alleys in our post bowling alley. The inter-battery bowling league will be started within a few days after this writing. The inter-battery basketball league is already under way. In each case a post team will be formed representing Fort Worden to compete with available civilian and service teams.

In the midst of a southern gale, at about midnight the end of the cable to Fort Casey was finally landed on the beach. The job called for the services of the cable laying barge, two tugs, the "L" boat, two searchlights and a tractor or two, plus the operations details. This busy scene on the beach was witnessed as a finale to his visit by the Chief of Coast Artillery.



West Point

By Lieutenant Alfred C. Gay

On September 17th, the Coast Artillery Association held its first business meeting for this academic year. Major Clare H. Armstrong was elected President, Lieutenant Lucius N. Cron, secretary-treasurer, Lieutenant Alfred C. Gay, publicity-correspondence officer. It was decided at this time to hold monthly meetings to discuss professional topics. This was one of the primary purposes of this chapter as originally organized.

On Wednesday, October 4th, a tea dance was held in honor of the new Coast Artillery officers. As usual, it was a great success. These informal dances again promise to be outstanding events.

On October 17th a meeting was held to discuss the "Antiaircraft Defense of the United States." The discussion was confined to the defense against a large-scale operation whose mission was to cripple industry and demoralize the people. In a one-hour lecture, Captain Fellers briefly analyzed the situation and presented some ideas for its solution. The meeting was then open for general discussion. Opinion was in agreement on three points: 1. Defense should be concentrated in the northeast and middle-west states since eighty per cent of our vital industry is in this area; 2. Attack would probably be by land based aircraft operating from bases within 600 miles of this area;

3. There will never be enough aircraft and antiaircraft artillery within the military establishment to give this area an adequate active defense. Here the agreement ended; imaginations ran rampant; and there were as many ideas as there were officers present. This can hardly be considered as a fault since a solution of the problem requires imagination and a radical departure from present thought if it is to be solved.

Coast Artillery training at West Point is confined to the Corps of Cadets. The high point of the year is the First Class trip to one of the nearby coast defenses. This year the 62d Coast Artillery ferried the class by truck to Fort Hancock for four days of seacoast and antiaircraft firing. The trip down and back was organized as a problem in the AA defense of a truck column. In addition to the cadet firing, a demonstration was given of the new 37-mm. antiaircraft gun. The cadets showed more than usual interest in our branch and its equipment.

A recent change in the disciplinary system within the Corps will be of interest to old grads. Cadets are no longer punished for exceeding their monthly allowance of demerits. Only the battalion board may award confinements or tours on the area.

THE ANNUAL CONVENTION

By CAPTAIN WEBER deVORE, 502d Coast Artillery (AA), RAI

The New York Convention—October 13th, 14th, and 15th—brought together a representative group of several hundred officers of the Regular Army, National Guard, and Organized Reserves. It also gave immense publicity to our arm and provided a practical test of cooperation among the three groups of officers. It was a great success and demonstrated beyond doubt the value of the United States Coast Artillery Association, its aims and personnel.

The convention opened with a reception at the home of the 244th Coast Artillery, New York National Guard. Colonel Malcolm W. Force, commanding the 244th, had arranged a hollow square on the drill floor—three sides consisted of guns and the fourth a well-stocked buffet. Needless to say there was no need to put the guns into action in order to get the guests into position. The band of the 244th supplied music for dancing.

The business meeting at Fort Totten on Saturday morning was featured by the address of Colonel Avery J. Cooper, commanding the 2d Coast Artillery District and Vice President of the Association. The report of the treasurer gave the highlights of the Association's activities during the past year.

Luncheon at the Fort Totten Officers' Club was followed by a demonstration on the parade ground of the equipment of the 62d Coast Artillery (AA) which included items of equipment that few officers had had the privilege of seeing before.

The formal dinner-dance in New York Saturday night lived up to expectations and was a brilliant and happy gathering.

Coast Artillery Day at the World's Fair on Sunday, fortunately for a large group of artillerymen who had a lot of work to do, was a beautiful and cool day.

Wide publicity had been given to the plans in the newspapers of the metropolitan area. Over the week-end radio stations referred to the artillery show at the Fair in more than forty broadcasts. Even the Police Department of New York City added to the publicity by releasing an urgent message which found its way into important positions in most papers declaring that the proposed blackout at the Fair had been cancelled. Then more publicity appeared to the effect that the police had relented and a partial blackout would be permitted.

Positions for display of equipment, later positions for firing, communication net, and listening posts through Long Island had all been reconnoitered and made ready. The staff work was ably handled by Captain Leo Schisgall, commanding C Battery, 212th Coast Artillery (AA), New York National Guard, and chairman of the executive committee of the Manhattan Chapter of the Association in charge of the convention, with the cooperation of other Regular and Reserve officers.

Promptly at 1:30 PM, the 212th Coast Artillery (AA), Colonel Edward E. Gauche, commanding, arrived at the Fair grounds after an uneventful and speedy convoy from

their quarters in New York City. Their seventy vehicles, including prime movers with new 3-inch antiaircraft guns and complete equipment, manned by 750 officers and men moved with precision into their appointed places despite traffic hazards and tremendous crowds of civilians. The units present included Regimental Headquarters, Headquarters Battery, Service Battery, 1st Battalion Headquarters, the searchlight battery, three gun batteries, 2d Battalion Headquarters, four machine-gun batteries, and the medical detachment.

The equipment of the regiment, augmented by 50-caliber machine guns and a new height finder of the 62d Coast Artillery (AA), was exhibited in the Court of Peace during the afternoon and presented a complete AA show. Even a hospital was set up and full equipment was made ready to take care of broken legs or broken necks—but no casualties of any kind occurred. In view of the recruiting task which National Guard regiments now face, the live interest of the many thousands who saw this demonstration, was most pleasing.

At 4:00 PM "March Order" was given to the units in the Court of Peace and in an astonishingly short period of time the large number of troops and matériel had left. Most of this equipment was moved into positions around Fountain Lake—1½ miles away—ready for night firing.

Following an announcement on the public-address system, an audience gathered before the band-shell in the Court of Peace to listen to a short program of Coast Artillery talks. And it was a crowd! One speaker estimated the audience as 55,000 people.

In the absence of Major General Sunderland, President of the Association, Colonel Avery J. Cooper, greeted the audience, gave a brief outline of the aims of the Association and the plans for the evening, and introduced the principal speaker, Colonel George U. Harvey, Inf.-Res., President of the Borough of Queens. Colonel Harvey in his usual brisk and thorough manner impressively sketched his ideas of the status of Army equipment and personnel entrusted with the defense of New York City. In easily understood and forcible language he referred to the necessity for more adequate defense. His remark that he had more pieces of motorized equipment in the Sewer Department of the Borough of Queens than the army has in and about New York City, was quoted in New York papers the next day. Lieutenant Colonel William J. Hislop, executive 212th Coast Artillery, followed Colonel Harvey with a talk on the organization of AA defense.

Later, a "Retreat parade" was given by the crack Army, Navy, and Marine battalions stationed at the Fair, in honor of the Association. The review was taken by Colonel Cooper.

The plan for the evening show, air-raid, blackout and demonstration of AA defense included reports from a chain of volunteer civilian listening posts set up through-

(Continued on page 608)

Coast Artillery Orders

(Covering the Period September 1 to October 31, 1939)

Colonel J. F. Cottrell, from Ft. Monroe, to the Philippines, sailing New York, December 27.

Colonel R. F. Cox, to 70th, Ft. Monroe.
Colonel T. H. Jones, from Ft. Adams, to 11th, Ft. H. G. Wright.

Colonel E. L. Kelly, to his home and await retirement.

Colonel W. G. Peace, retired, September 30.

Lieutenant Colonel R. D. Brown, from additional duty as military attaché to the Netherlands, The Hague.

Lieutenant Colonel F. E. Emery, Jr., to 70th, Ft. Monroe.

Lieutenant Colonel W. C. Foote, from 11th, Ft. H. G. Wright, to student, Army War College.

Lieutenant Colonel P. H. French, from Fort Monroe, to 68th, Fort Williams.

Lieutenant Colonel E. O. Halbert, from the Philippines, to 10th, Ft. Adams.

Lieutenant Colonel H. E. Small, from Panama, to 62d, Ft. Totten.

Major O. B. Bucher, to 2d C.A. District, New York.

Major H. D. Cassard, from Ft. Banks, to 68th, Ft. Williams.

Major Mario Cordero, from Ft. Barrancas, to 51st, Ft. Monroe.

Major J. T. deCamp, to 7th, Ft. Hancock.

Major A. M. Jackson, from Ft. Winfield Scott, to Panama, sailing San Francisco, October 10. Previous orders revoked.

Major A. W. Jones, from Philippines, to 52d, Ft. Hancock.

Major Creighton Kerr, to 2d, Ft. Monroe.

Major G. M. O'Connell, from Panama, to office, Chief of Coast Artillery. Previous orders amended.

Major M. H. Parsons, retired, October 31.

Major M. M. Read, retired, September 30.

Major A. W. Waldron, from Ft. Slocum, to Org. Res., 2d Corps Area.

Captain J. G. Bain, from Ft. Winfield Scott, to 69th, Ft. Crockett.

Captain G. R. Burgess, to 51st, Ft. Monroe.

Captain J. M. England, to 7th, Ft. Hancock.

Captain H. P. Gard, from Ft. H. G. Wright, to 68th, Ft. Williams.

Captain O. H. Gilbert, from Ft. Hancock, to 68th, Ft. Williams.

Captain R. H. Grinder, to 51st, Ft. Monroe.

Captain R. R. Hendrix, from the Philippines, to 63d, Ft. MacArthur.

Captain J. I. Hincke, to 2d, Ft. Monroe.

Captain P. A. Jaccard, to 7th, Ft. Hancock.

Captain G. E. Keeler, Jr., from Ft. Monroe, to 68th, Ft. Williams.

Captain E. G. Martin, to 2d, Ft. Monroe.

Captain J. M. Moore, from Ft. H. G. Wright, to 68th, Ft. Williams.

Captain Glenn Newman, from the Philippines, to 69th, Ft. Crockett.

Captain H. C. Parks, to 70th, Ft. Monroe.

Captain E. D. Peddicord, to 51st, Ft. Monroe.

Captain J. E. Reiersen, to 70th, Ft. Monroe.

Captain C. V. R. Schuyler, from C.A. Board, Ft. Monroe, to office, Chief of Coast Artillery.

Captain H. P. Tasker, retired, September 30.

Captain C. F. Tischbein, to 70th, Ft. Monroe.

Captain H. W. Ulmo promoted Major, August 15.

Captain C. B. Wahle, to 70th, Ft. Monroe.

Captain E. R. C. Ward, to 2d, Ft. Monroe.

Captain K. J. Woodbury, to 7th, Ft. Hancock.

First Lieutenant H. B. Cooper, Jr., to 2d, Ft. Monroe.

First Lieutenant C. F. Cordes, Jr., to 7th, Ft. Hancock.

First Lieutenant W. G. Fritz, to 51st, Ft. Monroe.

First Lieutenant A. L. Fuller, Jr., to 70th, Ft. Monroe.

First Lieutenant F. L. Furphy, from the Philippines, to student, Ordnance School, Aberdeen Proving Ground.

First Lieutenant W. H. Jordan, from the Philippines, to 2d, Ft. Monroe.

First Lieutenant Harry Julian, from Ft. Hancock, to the Philippines, sailing New York, December 27th.

First Lieutenant E. E. Lockhart, from Panama, to 2d, Ft. Monroe.

First Lieutenant F. M. McGoldrick, from Ft. H. G. Wright, to 68th, Ft. Williams.

First Lieutenant T. K. MacNair, from Ft. McPherson, to the Philippines, sailing Charleston, December 29.

First Lieutenant E. W. Moore, from Ft. Monroe, to Air Corps Primary Flying School, Randolph Field.

First Lieutenant J. W. Romlein, to 70th, Ft. Monroe.

First Lieutenant J. deV. Stevens, to 2d, Ft. Monroe.

First Lieutenant G. J. Weitzel, from Ft. H. G. Wright, to 68th, Ft. Williams.

First Lieutenant N. B. Wilson, from Hawaii, to 63d, Ft. MacArthur. Previous orders amended.

First Lieutenant Y. H. Wolfe, from Ft. H. G. Wright, to 68th, Ft. Williams.

First Lieutenant J. B. Yost, from the Philippines, to 2d, Ft. Monroe.

Second Lieutenant J. M. Banks, to 70th, Ft. Monroe.

Second Lieutenant R. B. Barry, Jr., CA-

Res., appointed in Regular Army. To 61st, Ft. Sheridan.

Second Lieutenant B. R. Brown, from Ft. Winfield Scott, to the Philippines, sailing San Francisco, January 17.

Second Lieutenant R. S. Chester, to 61st, Ft. Sheridan. Previous orders amended.

Second Lieutenant R. deF. Cleverly, from Ft. Sheridan, to 68th, Ft. Williams.

Second Lieutenant J. M. Cochran, to 63d, Ft. MacArthur. Previous orders amended.

Second Lieutenant H. deMetropolis, to 7th, Ft. Hancock.

Second Lieutenant P. R. Cornwall, to 2d, Ft. Monroe.

Second Lieutenant M. F. Gilchrist, Jr., to 62d, Ft. Totten. Previous orders amended.

Second Lieutenant C. F. Heasty, Jr., CA-Res., appointed in Regular Army. To 52d, Ft. Hancock.

Second Lieutenant R. H. Holloway, to 63d, Ft. MacArthur. Previous orders amended.

Second Lieutenant W. J. A. Hussey, to 51st, Ft. Monroe.

Second Lieutenant H. O. Johnson, CA-Res., appointed in Regular Army, to 6th, Ft. Winfield Scott.

Second Lieutenant L. M. Kirby, to 69th, Ft. Crockett. Previous orders revoked.

Second Lieutenant Geoffrey Lavell, to 63d, Ft. MacArthur. Previous orders amended.

Second Lieutenant G. F. Leist, from the Philippines, to 2d, Ft. Monroe.

Second Lieutenant A. F. MacDonald, CA-Res., appointed in Regular Army, to 13th, Ft. Barrancas.

Second Lieutenant D. Y. Nanney, to 61st, Ft. Sheridan. Previous orders amended.

Second Lieutenant F. K. Newcomer, Jr., to 62d, Ft. Totten. Previous orders amended.

Second Lieutenant H. R. Odom, to 65th, Ft. Winfield Scott. Previous orders amended.

Second Lieutenant C. C. Pulliam, to 61st, Ft. Sheridan. Previous orders amended.

Second Lieutenant C. W. Reeves, to 51st, Ft. Monroe.

Second Lieutenant D. R. Shoke, from Ft. Winfield Scott, to 69th, Ft. Crockett.

Second Lieutenant J. R. Snow, CA-Res., appointed in Regular Army, to 51st, Ft. Monroe.

Second Lieutenant W. L. Thorkelson, CA-Res., appointed in Regular Army, to 61st, Ft. Sheridan.

Second Lieutenant W. M. Vann, to 2d, Ft. Monroe.

Second Lieutenant J. W. Walker, from Ft. Monroe, to 68th, Ft. Williams.

Second Lieutenant A. B. White, to 7th, Ft. Hancock.

Second Lieutenant J. E. Wood, Jr., to 70th, Ft. Monroe.

The Contributors

CAPTAIN EDWARD BARBER, Coast Artillery Corps, entered the service from civil life in 1921 as a second lieutenant, Coast Artillery Corps. All his service has been with that arm. He is a graduate of the Coast Artillery School Basic Course (1922), Battery Officers' Course (1930), Advanced Engineering Course (1931), Massachusetts Institute of Technology (1935) and the Command and General Staff School (1939). Captain Barber is now a student at the Army War College.

LIEUTENANT C. ROBERT BARD, Coast Artillery Corps, enlisted in the Regular Army in February of 1926, winning an appointment as a cadet, U. S. Military Academy in July, 1927. Graduating with the Class of 1931, he was appointed a second lieutenant Coast Artillery Corps. At the moment Lieutenant Bard is detailed in the Judge Advocate General's Department as a student, University of Virginia at Charlottesville.

MAJOR COBURN L. BERRY, Coast Artillery Corps, is a native of Maine. After service as a second lieutenant, Maine National Guard, he was appointed a second lieutenant, Coast Artillery Corps, Regular Army, August 9, 1917. All his subsequent service has been with that arm. He is a graduate of the Coast Artillery School Battery Officers' Course (1923), and the Advanced Course (1934). He received the degree of B.S. in Chemistry from Worcester Polytechnic Institute in 1916. Major Berry is assistant P. M. S. and T., University of Minnesota, Minneapolis.

SERGEANT H. E. DEFLOIRIN, Headquarters Battery, 265th Coast Artillery, Florida National Guard, is a native of Georgia. He enlisted in the National Guard in early 1937 and reached the grade of sergeant a year later. He is engaged in the tobacco business at Jacksonville, Fla.

LIEUTENANT COLONEL HARRY C. INGLES, Signal Corps, graduated from the Military Academy with the Class of '14. Initially appointed in the Infantry he transferred

to the Signal Corps in 1920. Colonel Ingles is a graduate of the Signal School (1920), the Command and General Staff School (distinguished graduate 1927), and the Army War College (1932). As a member of the General Staff Corps he took a large part in the design of the new infantry division.

FLETCHER PRATT, New York historian, has recently published *Sea Power and Today's War* as well as articles in the *Saturday Evening Post* dealing with naval aspects of our national defense.

CAPTAIN JOHN E. REIERSON, Coast Artillery Corps, graduated from the Military Academy as a second lieutenant of Infantry on July 2, 1920. He transferred to the Coast Artillery Corps in September, 1920, and his subsequent service has been with that arm. He is a graduate of the Coast Artillery School Basic Course (1921) and the Battery Officers' Course (1927). Captain Reiersen is on duty with the 2d Coast Artillery, Fort Monroe.

MAJOR CAESAR R. ROBERTS, Coast Artillery Corps, was a cadet, U. S. Military Academy, from 1905 to 1907. After a few years commissioned service in the National Guard, State of Washington, he served as a lieutenant and captain, Quartermaster Corps, during the World War. He received his commission in the Coast Artillery of the Regular Army in 1920. Major Roberts is a graduate of the University of Washington (B.S., 1913), and the Coast Artillery School Battery Officers' Course (1929). He is on duty with the 64th Coast Artillery, Fort Shafter, Hawaii.

LIEUTENANT COLONEL VON WEDEL, German Army (author of "The Campaign in Poland") is a chief of section, General Staff Corps, at Berlin.

W. A. WINDAS, a free-lance writer of features, lives at Hollywood, California.



BOOK REVIEWS



AHRIMAN: A STUDY IN AIR BOMBARDMENT.

By Brigadier General Oliver Lyman Spaulding. Boston: 1939. 143 pages; appendix; bibliography; index; \$5.50.

It is indeed a pity that the many "experts" who daily inform the American public via press and air about the potentialities of aerial warfare appear to be without a copy of this little book. For a reading of it would make them doubly expert and would result in our people getting the plain unvarnished truth respecting air power and what it can do—and can't do. Moreover, a good many soldiers would also be the better—if only in holding up their end conversationally—for spending a few hours in company with General Spaulding's opus.

General Spaulding limits his inquiry to the study of bombardment of cities from the air; the other aspects of employment of air forces in general he does not touch on. He discusses the legal background of air bombardment and examines the theories which make direct action against civilian morale from the air an end in itself. After weighing the costs of such warfare against the results to be expected of it, he closes with speculation as to possible future action. He indulges in no prophecy and sticks to the facts for which all readers will be grateful.

A casual glance at the chapter headings will give you a slight idea of the scope of the book: Bombardment—The Traditional Law and Practice; World War Developments; General Douhet and the New Theory of War; The Douhet Theory in Practice; Criticisms of Douhet's Theory; The Air Raid—What Will It Cost?; What Can the Air Raid Accomplish?

Those interested in further exploration of the subject will find the bibliography alone worth the half dollar they spend for this book. The majority of the books mentioned in the bibliography should be found in almost any large-

sized library and will most certainly be on the shelves of libraries in the metropolitan centers.

This examination of air bombardment will rank well up with the author's other historical writings on ancient and modern warfare that are so well known to students of military history. It is fortunate that American scholarship has the services of so able an historian, for General Spaulding is now professor of military history at George Washington University, Washington, D. C.

✓ ✓ ✓

WOODROW WILSON, LIFE AND LETTERS: The Armistice, March 1-November 11, 1918. By Ray Stannard Baker. New York: Doubleday Doran & Company, Inc., 1939. Volume VIII, 626 pages; \$5.00.

This is the final volume of Baker's monumental life of President Wilson which he began in 1927. As suggested in previous reviews, Baker was a personal friend of Wilson and had at his disposal all the papers of the late president. With the completion of this eight-volume biography, the papers of Woodrow Wilson will be sent to the Library of Congress. Mr. Baker has treated elsewhere the work of President Wilson as a peacemaker: *What Wilson Did at Paris* (1919), *Woodrow Wilson and the World Settlement* (1923), and *The Public Papers of Woodrow Wilson* (1925-1927).

In many respects this volume is a fitting conclusion to a tremendous biographical task. Mr. Baker's technique of letting Wilson's letters and memoranda tell the story strung along on a thread of narrative supplied by the author never appeared so effective in the preceding volumes. Perhaps the mounting tension and climax of the war aided in maintaining the interest of the narrative. One is again impressed with the staggering range of the war president's interests, though military readers will be somewhat shocked to see how little of the president's time was spent on the primary business of the war: fighting Germany. His activities ranged from the discussion of mourning badges, slacker's buttons, Wagnerian music for the Philadelphia orchestra, woman suffrage, clemency for Mooney, to the sorrows of professors dismissed for alleged pro-German attitudes. If we are ever to face another war, somebody should see to it that the President of the United States is not bothered with the mass of trivial things which took up the time and energy of Woodrow Wilson.

In this volume the Wilson side of the Pershing-Woodrow controversy is presented. One is gratified to see the president and his advisors strenuously resisting the folly of the proposed Allied side-shows in Russia in 1918. And as the

war mounts to its climax in November, we see the president in ever deeper political water, struggling with a mass of pressing problems connected with the armistice. In this period he began to make the decisive political mistakes of his career. In each case he was warned in advance against the fatal step. Dr. Axson urged him early in July to make the necessary steps to attach the Republican senators in advance to his peace program. Wilson agreed with the wisdom of a proposed personal meeting with the important senators—but it never came off. His wife and others warned him against an appeal for a Democratic congress, but he was drawn into this error. Colonel House and others urged him to commit the Allies to his peace proposals while the war still made our aid imperative, saying that he would lose all his influence on Allied leaders the moment victory was secured. But, as it is now too tragically apparent, the armistice and the peace came into the world very much like Topsy, they just grew up out of splendid improvisations.

No reader can leave this book without a tremendous sympathy for the president. His idealistic and somewhat visionary aspirations for a better world endear him to our hearts. Yet the tragic sense of impending doom hangs over his gallant figure as he battles amid mounting chaos for his own pattern of Utopia. In view of what happened afterward, it seems good to have Secretary Tumulty note in the final pages of the book that as Wilson went down Philadelphia Avenue in the peace celebration: "I shall never forget how happy he looked."

H. A. D.

MEN AGAINST HITLER. By Fritz Max Caben.
New York: The Bobbs-Merrill Company, 1939. 258 pages; \$2.00.

This is not, as one might suppose, a tale of the present European blood letting. But the book does not lack for interest because of that. Far from it, in fact. This story—written by Germany's No. 1 refugee, long before the first bomb dropped on Warsaw—tells *why* a few million men are now earnestly endeavoring to slit each other's throats. And that, by the way, is a lot more than most of the belligerents themselves can do.

According to Caben, the greatest mistakes ever made was Marshal Foch's failure to press on to Berlin in order that all Germans should know that the war was lost. Those Germans, it seems, are hard to convince. They believed, for instance, that in 1914 they were the ones who were attacked. And they kept on believing it to the end. The idea finally did spread that it was impossible to win the war, but the feeling of innocence was never smothered. In the minds of the proletariat it was the Kaiser, his generals, and the Great General Staff that lost the war—and then ran away. It was the civilians, therefore, who signed the peace and upon them fell the terms of the victors.

The Treaty of Versailles, based on the presumption of German guilt, brought nationalistic feelings to the boiling point. It was not the land lost, nor the industries destroyed, but that portion of the treaty dealing with the

ESSAY COMPETITION 1940

a. PERMISSIBLE COMPETITORS:

Any member of the Coast Artillery Association at date of submission of essay.

b. SUBJECT:

To be selected by the author. Appropriateness of subject for Coast Artillery readers is a point to be considered in awarding prize.

c. PRIZES:

(1) Number:

(a) One First Prize—\$200.00. Not to be awarded if no essay submitted is outstanding.

(b) Not to exceed two Honorable Mention Prizes—\$100.00 each.

(2) Awarded by Chief of Coast Artillery upon recommendation of Board of Officers appointed by him. Membership of Committee to be published only after awards for the year have been made.

(3) Time limit.

No essay received after September 30th, 1940, will be awarded a prize.

(4) Payments.

Payments of prizes will be made immediately after awards are made. All essays submitted become the property of the COAST ARTILLERY JOURNAL. Any person receiving a prize for an essay will receive no other compensation. If any essay is published the author of which received no prize, such author will be paid at the usual rates.

d. HOW SUBMITTED:

Essays will be submitted to the Editor of the COAST ARTILLERY JOURNAL in a sealed envelope bearing the notation "Prize Essay Contest." The copy submitted will contain nothing to indicate its authorship, will be signed by a "nom de plume," and will be accompanied by a separate sealed envelope containing the nom de plume and also the name of the writer. This latter envelope will be delivered to the Chief of Coast Artillery when received and will be opened in the presence of the Editor of the COAST ARTILLERY JOURNAL after the relative merits of the essays have been determined.

e. FORM:

(1) Essays should be limited to approximately 8,000 words, but shorter articles will receive consideration.

(2) Three typewritten copies of each essay will be submitted on letter size paper (one original, two carbons) with double-spaced lines. At least one of any illustration will be a drawing, tracing, or photograph, not a blue print or brown print.

First Prize\$200.00

Honorable Mention Prizes.. 100.00

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The Coast Artillery Journal

war guilt of Germany that made it hard to take. The German people still believed in their own innocence, but were forced into biding their time before proving it. And prove it they were determined, even if it took a second war to do so. All they needed was a leader.

As for the rise of those leaders, Mr. Cahen deals with them none too gently. He tells how Goering escaped to Denmark in the plane which the disarmament commission had planned to take from him. Told also is how Goering lived an adventurous life on the proceeds of exhibition flights and later returned to Germany to join the new political party created by Adolf Hitler.

Cahen's descriptions are based upon first-hand knowledge since he himself early organized an underground party known as "The German Vanguard," aimed at countering the growing Nazi power. But the Vanguard became outlawed and Cahen along with it. He escaped execution by fleeing to Czechoslovakia, and from then on by keeping pretty much on the move. But even as an exile, Cahen never gave up the idea of staging a second German revolution before Hitlerism could bring about a second World War—or so this volume tells us.

Well, his prophecies have all come true, though his hopes have not. If, by any chance, Mr. Fritz Cahen is still one of the "Men Against Hitler," all we can say now, he has lots of company. E. D. C.

† † †

WORDS THAT WON THE WAR. By James R. Mock & Cedric Larson. Princeton: Princeton University Press, 1939. 372 pages; illustrated; notes; index. \$3.75.

The story of the Creel Committee—the official publicity agency of the United States during the World War—told for the first time. The sources for the work come from the committee's official files now stored in the National Archives. The writers have done a careful job of selection of materials and the book therefore is the first adequate treatment of the machinery involved in marshalling a great nation's public opinion.

Words that Won the War should appeal to the general reader. To a publicity officer—from the lowliest of posts to the highest of staffs—the book is indispensable.

† † †

IN STALIN'S SECRET SERVICE. By W. G. Krivitsky. New York: Harper and Brothers, 1939. 273 pages; \$3.00.

This is the inside story of the silent workings of the Soviets. Portions of the book appeared originally in serial form in the *Saturday Evening Post*. It will be recalled that Krivitsky prophesied the Soviet-German pact some months before it was consummated and won for himself ringing denunciation from American Communist groups. Since the German-Russian handshaking these groups and the Fellow Travelers have seen fit to more or less ignore Krivitsky.

The book also tells the somewhat amazing story of the

purge of Red Army officers, the staged trials of Soviet leaders, Stalin's efforts for years to appease Hitler, and the record of terror of the OGPU—the Soviet Secret Police. Some of the tales of plot and counter-plot in European cities—and on this side of the water too—make the efforts of mystery story writers look amateurish.

In Stalin's Secret Service is a "must" for the company library.

INFANTRY IN BATTLE. By the Military History Committee, Infantry School. Washington: The Infantry Journal, Inc. 1939. Second edition. 415 pages, 102 maps; \$3.00.

This is one of the very best military books that this reviewer has ever seen. It does not deal with the war waged on paper in the classroom but how it is actually fought by real men on real terrain. It is a collection of World War occurrences, showing how things really worked out. Each operation is carefully analyzed and the causes of success or failure are clearly shown.

Because the examples deal almost exclusively with small units the book is of great educational value to subalterns as well as to officers of higher rank. Every officer, regardless of grade, should own a copy of this book and should study it assiduously. And it isn't a hard book to study. In marked contrast to our usual texts, *Infantry in Battle* reads as easily as a novel; it is hard to lay it down. Anybody can read it and understand it. The sketch maps that illustrate each example are perfect.

The officers responsible for the planning, for the extensive research and for the painstaking analyses, deserve great credit for a splendid work which is nothing less than a conspicuous milestone in military literature. P. D. B.

LORD KITCHENER. By Lieutenant Colonel H. de Watteville. London: Blackie & Sons, Ltd., 1939. 201 pages; \$2.00.

This brief biography of Field Marshal Kitchener is a part of the "Order of Merit" series to which the author has also contributed a life of Lord Roberts. Though this work is based largely on secondary sources and relies heavily on Sir George Arthur's uncritical *Life of Lord Kitchener*, his judgements have been tempered by wide reading of other English material bearing on Lord Kitchener's career.

The theme which runs through this volume is: Lord Kitchener was *in* the British army *but not of it*. Unlike the other great British leaders of 1914-1918, Kitchener alone lacked military schooling of the academic sort. French, Haig, Robertson, Wilson, Rawlinson and the rest were staff college men, but Kitchener's formal study of war ended with his engineering course at Woolwich. He came to face Armageddon with a mind uncluttered with academic theories. His colonial experience (save in the preparations for the Omdurman campaign) was of little use to him. He was thus able to start out *de novo* in 1914.

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He made two shrewd military guesses at the outset: the war would last for at least three years, and Germany would invade Belgium. After that, it calls for all of Colonel de Watteville's literary skill and quotations from friendly secondary sources to safeguard his subject's reputation through the torturous years of 1915-1916. H. A. D.

PROPAGANDA FOR WAR. By H. C. Peterson. Norman: University of Oklahoma Press, 1939. 358 pages; illustrated; appendix; bibliography; index; \$3.00.

This book has gone into its fourth printing since it first appeared earlier this year—an index to its importance and interest at this time.

Mr. Peterson tells the story of what seems to him to be the reasons for our entry into the World War. He believes that British propaganda did as much as anything else to line us up with the Allies. In support of this thesis he introduces extracts from a series of printed reports from Wellington House—the British special publicity bureau. These reports were the *American Press Resume* and were prepared solely for the eyes of the British Cabinet and purported to tell cabinet members what Americans were thinking about. A page from one of the reports is reproduced as an illustration.

The story is worth reading, if only to confirm the suspicion that a lot of people find wooing American public opinion well worth the trouble.

IN DEFENSE OF FRANCE. By Edouard Daladier. New York: Doubleday Doran & Co.; 239 pages; \$2.50.

A collection of the addresses by the Premier for France from April, 1938, almost to the present day cannot fail to be of the utmost value and interest both to the student of world affairs and to the man in the street who strives to learn the meaning of daily events. Concise, clear and logical, the addresses show the purposes and motives of the French Government throughout the various crises in Europe that have shaken the world, and its determination to assure the safety of France, and the freedom and independence of the individual. A book of historical importance, it is also most interesting in the light it throws on the character of Daladier himself, for men influence events, and few will deny that Daladier is the strongest influence in the France of today. M. C.

THIS IS WAR! By Lucien Zacharoff. New York: Sheridan House, 1939. 342 pages; \$2.50.

This book styles itself "Everyman's guide to modern warfare" and promises to take the reader behind the scenes where the professional soldier does his dirty work. The revelations of M. Zacharoff are distinctly on the disappointing side to the soldier; he appears to be obsessed by the bacterial and death-ray theory of warfare. Chief among the claims to support his title of military "expert" is the fact that he was "an eye witness to the 1914-1918 War," distinction that is shared by a few million others.

ATTACK ON AMERICA. By General Ared White.
New York: Houghton Mifflin & Co., 302 pages;
\$2.50.

A vividly written book of secret service, spies, espionage and counter espionage, culminating in armed attacks on the United States from the South and the West Coast simultaneously. If, at times, events seem somewhat exaggerated this may be laid to the necessities of a quick moving novel.

The author, General Ared White, now Adjutant General, National Guard of Oregon, saw service in France in the World War. Therefore, it may be assumed that, although cast in fictional form, this book presents his actual conclusions as to certain dangers confronting the United States.

THE DEADLY PARALLEL. By C. Hartley Grattan.
New York: Stackpole Sons, 1939. 210 pages; \$2.00.

Here is another in the long series of books warning us against the machinations of the British Empire. One begins to suspect that these authors who so warn us are making a fairly good thing out of the Perfidious Albion theme, tiresome though it may be getting to the general reader.

Mr. Grattan includes a program for neutrality warranted to keep us out of war. His program is a modified isolationism plus a firm resolve to more or less let Europe go to the dogs by itself.

HOW WAR CAME. By Raymond Gram Swing. New York: W. W. Norton Co., 1939. 266 pages; \$2.00.

Here the radio commentator has his broadcasts reduced to print. Mr. Swing's radio talks covering the famous "14 days" of August 21-September 3 are preceded by other talks that followed the seizure of Czechoslovakia during the spring.

The book is interesting in that it gives you a slant of how current history appears to the man behind the mike. Mr. Swing has long been accounted an authority on European history by millions of radio listeners. Marked by sanity and freedom from hysterical over-emphasis his talks were a welcome relief from the many others that afflicted the air waves during the crisis of late August.

THE COMPLETE GUIDE TO MILITARY MAP READING. Aldershot, England: Gale & Polden, 1938. 154 Pages; Numerous exercises, 67 Figures and plates. \$1.75.

Maps and map reading techniques are fairly well standardized and much has been written on the subject. Nevertheless this book arouses interest, for although British military maps and map-reading techniques are basically the same as ours, it develops that their maps and technical nomenclature differ in certain details. For this reason this text should be of interest to the officer who may have occasion to use British military maps or who may be con-

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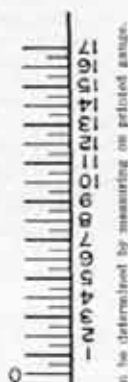
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It is a pleasure to see that the "notebook and compass" method of field sketching is given priority. This method is so simple, fast, and accurate, particularly for road sketching, that its omission from our own regulations is hard to understand. This method assures ample field data and can be used in wind, rain, snow, and in conditions of limited visibility. The drafting, done in the favorable environment of shelter and desk, results in a better sketch for the time and labor involved. Those who have tried to manipulate pins, alidade, and plane table with hands numb with wet and cold will appreciate this point.

H. V. D.

LAND OF THE SOVIETS. By Nicholas Mikhalov. New York: Lee, Furman, Inc., 1939. 351 Pages; 24 Maps; 18 Illustrations; Index. \$2.50.

Here is a one-volume guidebook to the Union of Soviet Socialist Republics. It tells of the topography, climate, natural resources, economic development and the people who speak a hundred different tongues.

There is a great deal of information in this handbook of the U.S.S.R.—some of it old, some new. When allowances are made for the natural enthusiasm of a writer dealing with his native land the book will fill the purpose of furnishing a sketch of the land that covers one-sixth of the world's surface.

MILITARY PREVENTIVE MEDICINE (Army Medical Bulletin No. 23, Third Edition). By Lieutenant Colonel George C. Dunham, Medical Corps. Carlisle Barracks, Pennsylvania: Medical Field Service School, 1938. 329 Illustrations; Appendices; Index. 1,198 Pages.

This is a new and enlarged edition of the standard official text by Lieutenant Colonel Dunham, which first appeared in 1930. More than ever, in its new form is it a Bible of preventive medicine for all who have the health of troops in their care. Clearly and simply written, it is a practical text alike useful to medical and non-medical command and staff.

Among the matters covered in full and readable detail are: water purification; sanitation of swimming pools; inspection of meat, poultry, eggs, and fish; dairy and milk-plant sanitation; waste disposal and sewage treatment; camp sanitation; control of rats, control of flies, mosquitos, lice, ticks, fleas, bedbugs, ants and other insects. The control of all diseases is also covered at length. There is a helpful chapter on sanitary surveys and orders, and a chapter on vital statistics. In fact, there is hardly a question on any matter of health and sanitation that a commander or staff surgeon might encounter of which this book does not treat.

G. V.

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The Annual Convention

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out the length of Long Island. The posts, about thirty in number and set to cover an area of five to ten mile squares were manned by members of the American Legion. The net was established through the activity of Lieutenant Colonel Charles I. Clark, commanding the 910th Coast Artillery (AA) with the coöperation of the county commanders of the New York American Legion in Nassau and Suffolk.

A flight of three ships of the 102d Observation Squadron, through the hearty coöperation of Major Lawrence I. Brower, New York National Guard, took off from Miller Field and flew out to a rendezvous point at the eastern tip of Long Island. From the time these planes turned toward the west and started for the Fair, they were under almost constant observation.

A large-scale map of Long Island was mounted outside AA headquarters, dotted with small electric lights designating the location of each listening post. As each message was received the proper light went on. The messages came without delay, due to the fast work of the personnel of the posts and the coöperation of the commercial telephone exchanges.

The success of this method of communication was outstanding, especially since two-way radio which had been counted upon, did not function under the peculiar conditions existing in the locality of the Fair.

Meanwhile, a running comment on the progress of the planes had been going forward on the loudspeaker system and great crowds of spectators moved into the Amusement Area to get a view of the firing. As a message came in from the last of the listening posts, a siren sounded and the major part of the illumination of the Amusement Area was cut off and the lights went into action. The planes were readily picked up and the two batteries of 3-inch guns, and two machine-gun platoons added to the realism of the show by opening fire with blanks. The 62d Coast Artillery had augmented the equipment of the 212th by two 3-inch guns and two searchlights brought from Fort Totten.

The public thought it a good show. The New York *Sun* the next day described it as the most spectacular event the Fair had put on and seemed to credit the interest the public had in Coast Artillery Day as responsible for the third largest attendance the Fair had had in a single day.

By 9:00 PM, the army units were on their way home, and the visiting conventioners were winding up the convention with a good deal of spirit in congenial spots in the Fair.

The Convention was a success. It forcefully demonstrated the successful coöperation among National Guard, Regular, and Reserve officers—all on a voluntary basis and with quite modest advance preparation. It had value not only as a publicity project and an entertaining program, but as an item of training.



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